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DEPARTMENT OF THE AIR FORCE
SUPPORTING DATA FOR FISCAL YEAR 1996

RESEARCH, DEVELOPMENT, TEST AND EVALUATION

DESCRIPTIVE SUMMARIES



FEBRUARY 1995

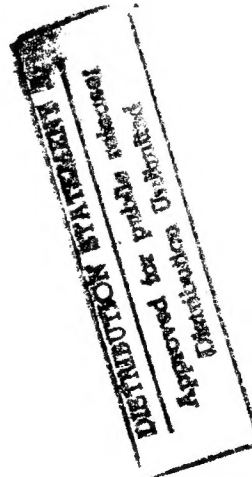
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**DESCRIPTIVE SUMMARIES FOR PROGRAM ELEMENTS OF
THE DEPARTMENT OF THE AIR FORCE RESEARCH AND DEVELOPMENT PROGRAM
FY 1996 BUDGET ESTIMATES
FEBRUARY 1995**

INTRODUCTION AND EXPLANATION OF CONTENTS

1. (U) GENERAL. This document has been prepared to provide information on the United States Air Force (USAF) Research, Development, Test and Evaluation (RDT&E) program to Congress committees during the Fiscal Year 1996 hearings. This information is in addition to the testimony given by DOD witnesses.

- a. (U) Exhibits R-2 and R-3 (formerly called Descriptive Summaries) provide narrative information for all RDT&E program elements and projects, except those listed in paragraph 4b, within the USAF FY95 RDT&E program. The formats and contents of this documents are in accordance with the guidelines and requirements of the Congressional committees insofar as possible.
 - b. (U) The "Other Program Funding Summary" portion of the R-2 includes, in addition to RDT&E funds, Procurement funds and quantities, Military Construction appropriation funds on specific development programs, Operations and Maintenance appropriation funds where they are essential to the development effort described, and where appropriate, Department of Energy (DOE) costs.
 - c. (U) There are no FY96 "Facilities Exhibits" that contain information on major improvement to and construction of government owned facilities funded by RDT&E.
 - d. (U) The FY95 reduction for the Small Business Innovative Research program is reflected in the R-2's FY95 column. The FY95 R-2 column differs from the R-1 column by the SBIR reduction amount with the exception of the Science and Technology Programs (6.1, Basic Research; 6.2, Exploratory Development; 6.3A, Advanced Development; and PE 0605306F, Ranch Hand).
2. (U) COMPARISON OF FISCAL YEARS 1995 AND 1996 DATA. A direct comparison of Fiscal Years 1995 and 1996 data shown in this document with corresponding data in the Descriptive Summaries dated February 1994 will reveal differences. Many of the differences are attributable to the following:
- a. (U) FY95 funding changes as a result of congressional action on the appropriation and/or proposed RDT&E reprogramming actions.

b. (U) FY94 funding changes between October 1, 1993 and September 30, 1994 due to RDT&E reprogramming actions, supplemental appropriations and rescissions.

c. (U) Reclassification of FY94 and FY95 data to achieve comparability with the program structure for FY96.

3. (U) Relationship of FY96 budget structure to the FY95 Budget approved by the Congress:

PE	TITLE	REMARKS
0101213F	Minuteman Squadrons	Terminated; transferred resources to PE 0604851 ICBM, EMD, and PE 0603851F ICBM Dem/Val
0207136F	Manned Destruction Suppression	Transferred-in project 2671- FY95 and prior funded under another (classified) PE Terminated project 3777 was incorrectly put in ABIDES the correct project number is 4375 which is terminated in FY96
0207160F	Tri-Service Standoff attack Missile	Terminated FY95
0207422F	Deployable C3 Systems	Transferred-in FY96 to 0207423F, project 1013
0207423F	Advanced Communications Systems	Transferred-in project 1013- FY95 program funded in PE0207422F
0207590F	Seek Eagle	Transferred-in project 2784- FY95 and prior funded in PE 0604602F
0303110F	Defense Satellite Communications System (DSCS)	New Start project 2638 begins subproject Service Life Extension Program
0303144F	Electromag Compatability Analysis Center (ECAC)	Transfer to Joint Spectrum Center (DISA) PE 033144K
0303605F	MILSATCOM	Zero transfer to 3400 by Congressional direction
0305119F	Medium Launch Vehicles	Transferred a portion of funds to PE 0603853F EELV
0305128F	Security Investigative Activities	New Start FY96

0305145F	Arms Control Implementation	New Start project 4190
0305158F	Constant Source	Eliminated project 4071 and transferred funds to start two new projects, 4394 and 4395 for better visibility
0305906F	NCMC TW/AA System	New Start; Congressional transfer in FY95
0305910F	Spacetrack	Eliminated project 2296-was not started in FY95
0401119F	C-5 Airlift Squadrons	New Start FY97 only
0401218F	KC-135s	Terminated project 2214 FY96 Transfer funds from 4285 to 4286 New Start project 4403 FY96
0404102F	Aerospace Rescue and Recovery	New Start FY96
0602201F	Aerospace Flight Dynamics	Transferred-in resources to project 4397 from PE 0602206F, project 2673
0602202F	Human Systems Technology	Combined PE 0602205F and 0602206F into this PE Transferred project 1121 to project 1123 Transferred project 2673 to PE 0602201 project 4397 Transferred project 6302 to project 7757 Transferred project 6893 to project 7184 Transferred project 7231 to projects 7184 & 7757 Transferred project 7719 to project 1123 Transferred project 7930 to project 7184
0602205F	Personnel, Training & Simulation	PE 0602205F & 0602206F were combined into 0602202F
0602206F	Civil Engineering & Environmental Quality	
0602602F	Conventional Munitions	Transferred resources from project 2567 to project 2068

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0603205F	Flight Vehicle Technologies	Transferred resources from project 2506 to project 2978
0603250F	Lincoln Laboratory	Transferred resources from PE 0603723F project 2104 to project 4398 Terminated PE in FY96
0603253F	Advanced Avionics Integration	Transferred project 3833 to PE 0603800F (JAST) in FY95 & out as it was denied by Congress in FY94 Restructured PE to address aging aircraft & obsolescence of avionics inventory
0603302F	Space & Missile Rocket Propulsion	Transferred a portion of project 6340 & 6341 to project 4373 Transferred a portion of project 6341 to project 6339 Transferred-in project 0003 from PE 0603401F
0603308F	Strategic Missile Modernization	Terminated; resources transferred to PE 0603851F ICBM Dem/Val
0603311F	Ballistic Missiles Technology	Terminated project 4092 FY96
0603401F	Advanced Spacecraft Technology	Transferred-in resources to project 4400 from PE 0603438F Transferred project 0003 to PE 0603302F
0603438F	Satellite Systems Survivability	Transferred resources to PE 0603401F project 4400
0603723F	Civil & Environmental Engineering Technology	Transferred project 2104 to PE 0603205F project 4398
0603851F	Intercontinental Ballistic Missile Dem/Val	New Start PE and project initiated by Congress
0603853F	Evolved Expendable Launch Vehicle	New Start project 0006 funds EELV which was initiated by Congress in FY95
0604201F	Aircraft Avionics Equipmnt Development	New Start project 2050 JHMCS is currently in phase 0 (concept exploration)
0604227F	Training Systems Development	Transferred project 3135 to PE 0604243F, project 4369, for FYs 96-98. FY99 and outyears remain in PE0604227F project 2325
0604233F	Specialized Undergraduate Pilot	New Start project 4376

Training

0604256F	Threat Simulator Development	Terminated project 1006 Transferred from PE 0605708F to project 2900 Transferred from PE 0305887F to project 2907
0604270F	Electronic Warfare Development	Terminated project 2066 (EF-111A SIP) in FY96 with retirement of EF-111A in FY97 Combined project 3896 and project 4077 to project 3891 beginning in FY96
0604441F & 0603441F	SBIRS EMD & DEM/VAL	New Start; project 0002 continues funding of MSTI from PE 0603402F. Funding initiated by Congress in FY95
0604480F	GPS IIF	New Start PE and project 0005; resources from PE 0305165F Satellite Replenishment effort
0604600F	Munitions Dispenser Development	New PE. Prior to FY95, project 1015 was funded in PE 0604604F
0604601F	C/B Defense Equipment	FY96 and out resources transferred to RDT&E Defensewide PE
0604602F	Armament/Ordnance Development	Transferred project 2784 to PE 0207590F (Seek Eagle)
0604609F	R&M Maturation/Technology Insertion	PE eliminated; effort and resources transferred to PE 0708026F
0604617F	Air Base Operability	Combined projects 2621, 3141, 4057, and 4058 were consolidated under project 2895 beginning FY96
0604704F	Common Support Equipment Development	Transferred project 3759 to PE 0708611F
0604711F	Systems Survivability Nuclear Affects	Terminated FY96. Funding on R-1 is an administrative error
0604851F	EMD	New start PE and project initiated by Congress in FY95
0605708F	NAVSLED Radar Track	PE eliminated. Effort and resources transferred to 0605807F (project 06TG) and 0604256F Threat Simulator Development

0605807F	Test & Evaluation Support	Transferred a portion of funds to 0605896F Base Operations RDT&E projects 06BS, 06CE, & 06UT from project 06TS. Transferred in resources from PEs 0605708F, 0605863F, 0605876F, and 0605878F
0604853F	Environmental Conservation	New PE. Effort and resources transferred from PE 0605856F
0605854F	Pollution Prevention	Transferred-in resources from PE 0708054F
0605856F	Environmental Compliance	Transferred a portion of funds to start PE 0605853F
0605863F	Aircraft Support	PE eliminated. Effort and resources transferred to 06050807F project 06AS
0605876F	Minor Construction	PE eliminated. Effort and resources transferred to 06050807F project 06MC
0605878F	Maintenance & Repair	PE eliminated. Effort and resources transferred to 0605807F project 06MR
0708012F	Logistic Support Activities	Transferred resources to PE 0708611F Support Systems Development and 0604740F Product Data Systems Modernization
0708026F	Productivity, Reliability, Availability, Maintainability (PRAM)	Transferred-in resources from PE 0604609F
0708054F	Pollution Prevention	Transferred resources to 0605854F
0708611F	Support Systems Development	New Start consolidated resources transferred from portions of 0708012F, 0604704F and 0604740F

Budget Activities 6.1, 6.2, 6.3, and Ranch Hand II Epidemiology Study (PE 0605306F); reference the FY95 projects that begin with "06." For FY96 and beyond, resources were transferred to the appropriate technical project within the PE.

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131	0102412F	Distant Early Warning (DEW) Stations	I	44
132	0207129F	F-111 Squadrons	I	49
133	0207133F	F-16 Squadrons	I	69
134	0207134F	F-15E Squadrons (also PE 0201730F)	I	79
135	0207136F	Manned Destructive Suppression	I	87
136	0207141F	F-117A Squadrons	I	99
137	0207160F	Tri-Serv Standoff Attk Missl (TSSAM)	I	110
138	0207161F	Tactical Air Intercept Missile (AIM)	I	115
139	0207163F	Adv Med Range A/A Msl (Procurement)	I	122
141	0207247F	Air Force TENCAP	I	129
144	0207412F	Theater Air Control System Improvements	I	133
145	0207417F	Airborne Warning & Control Sys	I	138
146	0207419F	Tactical Airborne CMD & Control Sys	I	143
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154	0207590F	SEEK EAGLE	I	175
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133	0207133F	F-16 Squadrons	I	69
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136	0207141F	F-117A Squadrons	I	99
137	0207160F	Tri-Serv Stndoff Attk Missl (TSSAM)	I	110
138	0207161F	Tactical Air Intercept Missile (AIM)	I	115
139	0207163F	Adv Med Range A/A Msl (Procurement)	I	122
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166	0303110F	Def Satellite Comm Sys	I	217
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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)							DATE		February 1995		
BUDGET ACTIVITY			PE NUMBER AND TITLE								
3 - Advanced Development			0603302F Space and Missile Rocket Propulsion								
COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Total Program Element (PE) Cost	11,564	16,492	15,203	14,441	14,642	15,833	18,157	19,495	Continuing	Continuing	
0003 Launch Vehicle Technology	0	0	600	600	600	600	600	600	Continuing	Continuing	
4373 Launch Propulsion Technology	0	0	12,603	11,641	11,432	12,323	13,437	13,405	Continuing	Continuing	
6339 Tactical Propulsion Technology	0	0	300	500	1,110	1,110	2,020	2,990	Continuing	Continuing	
6340 Satellite Control and On-Orbit Transfer Propulsion Technology	7,267	8,836	1,700	1,700	1,500	1,800	2,100	2,500	Continuing	Continuing	
6341 Missile Systems Propulsion Technology	4,297	7,656	0	0	0	0	0	0	Continuing	Continuing	

(U) A. **Mission Description and Budget Item Justification:** This Advanced Development program develops and demonstrates advanced rocket propulsion and space launch technology. This program is the key technology step to transition the most promising rocket propulsion and space launch technologies developed and demonstrates them in applications using full-scale, proof-of-principle demonstrations. The projects within this program are structured to support Air Force Space Command's and Air Combat Command's mission area requirements for space and missile launch technologies which include the goals established in the Integrated High Payoff Rocket Propulsion Technology Initiative (IHRPT), a joint DOD, NASA, and Industry effort to focus rocket propulsion technology to the needs of the nation. Solid propellant technology with higher performance than current propellants and environmentally acceptable exhaust products, manufactured using environmentally sensitive processes, are under development. New and improved component technologies will be integrated with propellant advances to develop new propulsion systems for the next generation of launch vehicles and satellites. Anticipated technology advances in this program are to improve performance and reduce propulsion system costs by the year 2000 (IHRPT Phase I completion). These advances equate to expendable system payloads of 7-10% increased payload capability at 14% reduced launch cost. Potential reusable system payloads include 71% increased payload capability with increased system life and 14% reduced launch cost. Technologies demonstrated under this program will also support NASA propulsion needs. The space launch and missile propulsion industry also leverages the technologies from this program to enhance the country's industry competitiveness. All efforts in this program element contain the resources necessary, including civilian salaries, to manage, conduct, and document the technical activities.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

3 - Advanced Development

0603302F Space and Missile Rocket Propulsion

(U) B. Program Change Summary (\$ in Thousands):

	FY 1994	FY 1995	FY 1996	FY 1997	Total Cost Cont
(U) Previous President's Budget	11,727	11,800	13,675	12,909	
(U) Appropriated Value	12,030	16,800			
(U) Adjustments to Appropriated Value					
a. Congressional General Reductions	-303	-308			
b. SBIR	-163				
(U) Current President's Budget	11,564	16,492	15,203	14,441	Cont

(U) Change Summary Explanation:

Funding: Funding change was a result of increased priority for space launch propulsion.

Schedule: Not Applicable.

Technical: In FY 1996, Project 0003, Launch Vehicle Technology, is transferred from PE 0603401F to this PE to combine all space launch technology into a single PE.

(U) C. Other Program Funding Summary: Not Applicable.(U) D. Schedule Profile: Not Applicable.

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE February 1995																			
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT																			
3 - Advanced Development		0603302F Space and Missile Rocket Propulsion								0003																			
COST (In Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost																		
0003	Launch Vehicle Technology	0	0	600	600	600	600	600	600	Continuing	Continuing																		
<p>(U) A. Mission Description and Budget Item Justification: This project demonstrates all advanced and innovative launch vehicle technologies in the areas of structures (i.e., fairings, interstages, struts, thermal protection systems, etc.), tanks, and operations to reduce launch costs and launch reaction time of existing and future launch vehicles. This project is transferred to this PE in FY 1996 from PE 0603401F where it was placed in FY 1995 as a result of a Congressional add for Reusable Launch Technology.</p> <p>(U) <u>FY 1994:</u> Not Applicable.</p> <p>(U) <u>FY 1995:</u> Not Applicable.</p> <p>(U) <u>FY 1996:</u></p> <p>– (U) Continue space launch vehicle technology development. (\$600K)</p> <p>– (U) Fabricate sub-scale subcomponents for advanced composite interstages for future launch vehicles, validating design and manufacturing techniques that promise up to 50% weight reductions and 30-60% cost reductions.</p> <p>(U) <u>FY 1997:</u></p> <p>– (U) Continue space launch vehicle technology development. (\$600K)</p> <p>– (U) Fabricate full size advanced composite interstages for future launch vehicles, validating design and manufacturing techniques that promise up to 50% weight reductions and 30-60% cost reductions.</p> <p>(U) B. Program Change Summary (\$ in Thousands):</p> <table> <tr> <td></td> <td>FY 1994</td> <td>FY 1995</td> <td>FY 1996</td> <td>FY 1997</td> <td>Total</td> </tr> <tr> <td>(U) Previous President's Budget</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>Cost</td> </tr> <tr> <td>(U) Current President's Budget</td> <td>0</td> <td>0</td> <td>600</td> <td>600</td> <td>Cont</td> </tr> </table>													FY 1994	FY 1995	FY 1996	FY 1997	Total	(U) Previous President's Budget	0	0	0	0	Cost	(U) Current President's Budget	0	0	600	600	Cont
	FY 1994	FY 1995	FY 1996	FY 1997	Total																								
(U) Previous President's Budget	0	0	0	0	Cost																								
(U) Current President's Budget	0	0	600	600	Cont																								

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - Advanced Development	0603302F Space and Missile Rocket Propulsion	0003
<p>(U) Change Summary Explanation: Funding: This project was a Congressionally-directed new start in FY 1995 in PE 0603401F and is combined in this PE to maintain synergy with all launch vehicle and propulsion technology development.</p> <p>Schedule: Not Applicable.</p> <p>Technical: Not Applicable.</p> <p>(U) C. <u>Other Program Funding Summary:</u></p> <p>(U) Related Activities:</p> <ul style="list-style-type: none"> - (U) PE 0602102F, Materials. - (U) PE 0602601F, Phillips Laboratory. - (U) PE 0603401F, Advanced Spacecraft Technology. - (U) PE 0603853F, Evolved Expendable Launch Vehicle Program. - (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication. <p>(U) D. <u>Schedule Profile:</u> Not Applicable.</p>		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
3 - Advanced Development		0603302F Space and Missile Rocket Propulsion								4373	
COST (In Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
4373	Launch Propulsion Technology	0	0	12,603	11,641	11,432	12,323	13,437	13,405	Continuing	Continuing

(U) **A. Mission Description and Budget Item Justification:** This project demonstrates advanced and innovative low-cost turbomachinery, low-cost space and missile launch propulsion system manufacturing technologies, environmentally acceptable propellants, and propulsion system components compatible with these environmentally safe propellants for current and future launch systems. The project emphasizes environmentally acceptable, as well as propulsion system affordability, reliability, reusability, reduced weight, reduced operation and launch costs, and increased life and performance. Anticipated system payoffs include a 50% decrease in launch costs and a 50% increase in payload to geosynchronous earth orbit by 2010 for existing launch systems. The technologies will enable a new expendable launch system to achieve a 34% reduction in gross lift-off weight and an 80% reduction in launch costs. A reusable spacelift system will realize a 42% reduction in vehicle gross lift-off weight or a 400% increase in payload to low earth orbit with these technologies. This technology was previously contained in Projects 6340 and 6341.

(U) FY 1994: Not Applicable.

(U) FY 1995: Not Applicable.

(U) FY 1996:

- (U) Continue technology development of advanced, environmentally acceptable propellants for current and future launch systems. (\$5,448K)
- (U) Complete large-scale testing of chlorine free space launch propellant and verify the performance capabilities and cost benefits for replacement of current toxic space boost propellants.
- (U) Quantify the cost benefits and performance characteristics of solid motors developed using environmentally acceptable processing techniques.
- (U) Conduct impact analysis of environmental propellant effects on solid rocket motor components (such as hotter burning temperatures and highly erosive environments) and determine increased performance needs of replacement components.
- (U) Test low-cost, carbon/carbon nozzles to quantify the manufacturing cost savings of a new rapid densification process.
- (U) Continue development of liquid propulsion technologies for existing and future launch vehicles. (\$7,155K)
- (U) Complete design and begin fabrication of the oxygen and hydrogen turbopumps to fabricate, integrate, and assemble low-cost, highly reliable turbopump, preburner, and thrust chamber components with fluid film bearing technologies to increase liquid booster propulsion capabilities.

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DATE

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BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

3 - Advanced Development

0603302F Space and Missile Rocket Propulsion

4373

(U) FY 1997:

- (U) Continue technology development of advanced, environmentally acceptable propellants for current and future launch systems. (\$1,750K)
- (U) Publish final report for chlorine free space launch propellant.
- (U) Publish final report on environmentally acceptable processing techniques of solid rocket motor propellants, liners, and insulations.
- (U) Continue technology development of components for solid boosters. (\$2,000K)
- (U) Analyze data and determine alternative materials and manufacturing processes to produce replacement components capable of withstanding the new environmentally safe propellant storing and firing conditions.
- (U) Begin data analysis and integration of a low-cost, highly operable solid motor project to quantify the performance increases over current solid rocket motor propellants while achieving 100% environmental acceptance. The decreased cost and increased manufacturability and operability of the solution propellants will also be demonstrated and quantified.
- (U) Demonstrate improved strength and temperature capabilities of low-cost, carbon/carbon nozzles manufactured with a new rapid densification process.
- (U) Develop hybrid rocket propulsion for current and future launch systems. (\$1,012K)
- (U) Analyze and compile data to pull together the current state of the art design techniques, components, and propellants to demonstrate the safety, operability, and cost gains that can be realized by utilizing a hybrid rocket motor on space launch vehicles.
- (U) Continue development of liquid propulsion technologies for existing and future launch vehicles. (\$6,879K)
- (U) Integrate and assemble the oxygen and hydrogen turbopumps with fluid film bearing technologies to increase liquid booster propulsion capabilities.

(U) B. Program Change Summary (\$ in Thousands):

	FY 1994	FY 1995	FY 1996	FY 1997	Total
(U) Previous President's Budget	0	0	0	0	Cost
(U) Current President's Budget	0	0	12,603	11,641	Cont

(U) Change Summary Explanation:

Funding: All launch technology was combined into a single project from Projects 6340 and 6341.

Schedule: Not Applicable.

Technical: Not Applicable.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
3 - Advanced Development	0603302F Space and Missile Rocket Propulsion	4373	
<p>(U) C. <u>Other Program Funding Summary:</u></p> <p>(U) <u>Related Activities:</u></p> <ul style="list-style-type: none">- (U) PE 0602601F, Phillips Laboratory.- (U) PE 0603853F, Evolved Expendable Launch Vehicle Program.- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication. <p>(U) D. <u>Schedule Profile:</u> Not Applicable.</p>			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

3 - Advanced Development

0603302F Space and Missile Rocket Propulsion

6339

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
6339 Tactical Propulsion Technology	0	0	300	500	1,110	1,110	2,020	2,990	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification: This project demonstrates advanced and innovative highly energetic/safe propellants, environmentally compliant propulsion systems, improved case/insulation/propellant interfaces, nozzle development and integration, thrust vector control, thrust modulation, signature characterization, and signature reduction technologies for current and future tactical missile systems. The emphasis is on propulsion system affordability, reliability, reduced weight, reduced operation costs, and increased life and performance. Anticipated payoffs identified through the Integrated High Payoff Rocket Propulsion Technology Initiative (IHPRPT) from these technologies include a 49% range increase, 50% size reduction, 100% increase in loiter time, 100% payload increase, and 21% reduction in time-to-target. This technology effort was part of Project 6341 technology development of components for solid boosters prior to FY 1996.

(U) FY 1994: Not Applicable.

(U) FY 1995: Not Applicable.

(U) FY 1996:

- (U) Develop and characterize in lab size quantities, propellants and components that can be incorporated into the design and manufacturing of missile systems that will result in high performance, low environmental impacts, and reduced signature characteristics. (\$150K)
 - (U) Complete analysis to develop environmentally acceptable, minimum smoke/low erosion propellants, insulators and nozzle coatings, and solventless manufacturing processes to improve delivered energy and reduce signature.
- (U) Conduct system payoff analyses to validate program objectives and approaches to successfully achieve the IHPRPT tactical goals. (\$150K)
 - (U) Conduct payoff analyses to identify all candidate component technologies and determine their benefit to aircraft survivability and kill ratio.

(U) FY 1997:

- (U) Develop and characterize in lab size quantities, propellants and components that can be incorporated into the design and manufacturing of missile systems that will result in high performance, low environmental impacts, and reduced signature characteristics. (\$350K)
 - (U) Demonstrate environmentally acceptable, minimum smoke/low erosion insulators and nozzle coatings, and solventless manufacturing processes, and begin hardware design of new combustion chambers to improve delivered energy and reduce signature.
- (U) Finalize system payoff analyses to achieve program objectives and approaches and successfully achieve the IHPRPT tactical goals. (\$150K)
 - (U) Finish system payoff analyses and downselect the best candidate technologies and to prove their benefit to aircraft survivability and kill ratio.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

February 1995

PE NUMBER AND TITLE

0603302F Space and Missile Rocket Propulsion

6339

(U) Previous President's Budget
(U) Current President's Budget

(U) Change Summary Explanation:

Funding: Effort previously part of Project 6341.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0602601F, Phillips Laboratory.
(U) PE 0602303A, Missile Technology.
(U) PE 060313A, Missile and Rocket Advanced Technology.
(U) PE 0603792N, Advanced Technology Transition.
(U) This project has been coordinated through the Project Relia-

(U) D. Schedule Profile: Not Applicable.

—

	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>	
Total	0	0	0	0	Cost
	0	0	300	500	Cont

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DATE

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BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

3 - Advanced Development

0603302F Space and Missile Rocket Propulsion

6340

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
6340 Satellite Control and On-Orbit Transfer Propulsion Technology	7,267	8,836	1,700	1,700	1,500	1,800	2,100	2,500	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification: This project demonstrates rocket propulsion system technologies for chemical, electric, and solar propulsion systems for station keeping, on-orbit maneuvering applications, and on-orbit transfer. Technology areas that are being investigated include ground demonstrations of compact, lightweight advanced propulsion systems, higher efficiency conversion systems coupled with an improved understanding of combustion fundamentals, and high energy chemical propellant development which will lead to propulsion system delivered impulse. Integrated High Payoff Rocket Propulsion Technology Initiative (IHPRPT) anticipated payoffs include a seven year increase in satellite on-orbit time, 50% increase in satellite maneuvering capability, a 25% reduction in orbit transfer operations costs, and a 15% increase in satellite payload. In FY 1996, liquid propulsion technology is removed from this project and consolidated with all launch propulsion in Project 4373.

(U) FY 1994:

- (U) Continued orbit transfer and maneuvering technology demonstration. (\$7,017K)
- (U) Flight-qualified the 30-kilowatt (kW) ammonia arcjet, conducted integrated mission simulation, and delivered arcjet for integration into the space test and transportation satellite for demonstration of advanced orbit transfer capability.
- (U) Completed initial evaluation of the 10-kW ammonia arcjet for satellite station keeping.
- (U) Continued development of space launch propulsion technologies for existing and future launch vehicles. (\$250K)

(U) FY 1995:

- (U) Continue orbit transfer and maneuvering technology demonstration. (\$1,820K)
- (U) Complete the 30-kW ammonia arcjet flight qualification, deliver, and integrate with the space test and transportation satellite for demonstration of advanced orbit transfer capability.
- (U) Continue development of space launch propulsion technologies for existing and future launch vehicles. (\$7,016K)
- (U) Complete risk mitigation testing of liquid engine components to fabricate, integrate, and assemble low-cost, highly reliable turbopump, preburner, and thrust chamber components with fluid film bearing technologies to increase liquid system booster propulsion capabilities.

(U) FY 1996:

- (U) Continue orbit transfer and maneuvering technology demonstration. (\$1,700K)
- (U) Launch the 30-kW ammonia arcjet on the space test and transportation satellite to measure performance, integration, and satellite interaction issues with an electric propulsion system (issues like electro-magnetic impulse, contamination, solar array degradation, etc.), and write final report.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	PROJECT																		
BUDGET ACTIVITY	PE NUMBER AND TITLE	February 1995	6340																		
3 - Advanced Development		0603302F Space and Missile Rocket Propulsion																			
<p>(U) Design a satellite thruster with an anode layer (Hall Thruster) and test the breadboard power processing unit with a specific impulse of 1500 sec, which will enable the repositioning capabilities of current satellites to be tripled.</p> <p>(U) FY 1997:</p> <ul style="list-style-type: none"> (U) Continue orbit transfer and maneuvering technology demonstration. (\$1,700K) (U) Demonstrate the Hall Thruster breadboard power processing unit for flight qualification. <p>(U) B. Program Change Summary (\$ in Thousands):</p> <table border="1"> <thead> <tr> <th></th> <th>FY 1994</th> <th>FY 1995</th> <th>FY 1996</th> <th>FY 1997</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>(U) Previous President's Budget</td> <td>7,430</td> <td>6,490</td> <td>8,261</td> <td>7,634</td> <td>Cost</td> </tr> <tr> <td>(U) Current President's Budget</td> <td>7,267</td> <td>8,836</td> <td>1,700</td> <td>1,700</td> <td>Cont</td> </tr> </tbody> </table> <p>(U) Change Summary Explanation: Funding: Project previously included liquid propulsion technology which is now combined with all space launch propulsion technology in Project 4373. FY 1995 increase reflects Congressional add.</p> <p>Schedule: Not Applicable.</p> <p>Technical: Not Applicable.</p> <p>(U) C. Other Program Funding Summary:</p> <p>(U) Related Activities:</p> <ul style="list-style-type: none"> (U) PE 0602601F, Phillips Laboratory. (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication. <p>(U) D. Schedule Profile: Not Applicable.</p>					FY 1994	FY 1995	FY 1996	FY 1997	Total	(U) Previous President's Budget	7,430	6,490	8,261	7,634	Cost	(U) Current President's Budget	7,267	8,836	1,700	1,700	Cont
	FY 1994	FY 1995	FY 1996	FY 1997	Total																
(U) Previous President's Budget	7,430	6,490	8,261	7,634	Cost																
(U) Current President's Budget	7,267	8,836	1,700	1,700	Cont																

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE		February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT			
3 - Advanced Development		0603302F Space and Missile Rocket Propulsion								6341			
COST (In Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost		
6341	Missile Systems Propulsion Technology	4,297	7,656	0	0	0	0	0	0	0	Continuing	Continuing	
<p>(U) <u>A. Mission Description and Budget Item Justification:</u> This project develops innovative and advanced solid propulsion systems for tactical and ballistic missile applications. The emphasis of this project is environmental acceptability, as well as reducing the development and fabrication costs of future missile propulsion systems and increasing the reliability and life of these systems. Technologies developed under this project may also be applied to solid propulsion space launch vehicles including boosters and orbit transfer vehicles. In FY 1996, booster propulsion technology is combined in Project 4373.</p> <p>(U) <u>FY 1994:</u></p> <ul style="list-style-type: none"> - (U) Demonstrated use of reclaimed ammonium perchlorate in full-scale Minuteman Stage II class motor, reducing the amount of hazardous waste generated during solid rocket motor development, repouring, and demilitarization. (\$4,197K) - (U) Validated (through demonstrations), quantified, and wrote report on the reduced chemicals generated through the use of reclaimed ammonium perchlorate. - (U) Completed analysis of environmentally acceptable processing techniques to produce environmentally safe propellants, liners, and insulations. - (U) Continued technology development of components for solid boosters. (\$100K) - (U) Completed testing of new "integrated stage" nozzle/exit cone designs and demonstrated capability to reduce system weight and improve propellant loading capabilities. <p>(U) <u>FY 1995:</u></p> <ul style="list-style-type: none"> - (U) Continue technology development of advanced, environmentally acceptable solid propellants for current and future missile systems. (\$4,913K) - (U) Complete hazard testing of chlorine free space launch propellant and demonstrate performance capabilities and ballistic properties to establish a baseline for future environmental propellant development. - (U) Complete hazard verification of a low chlorine or chlorine free replacement propellant for strategic (storable) applications. - (U) Demonstrate scaled-up environmentally acceptable processing techniques to produce environmentally safe propellants, liners, and insulations. - (U) Continue technology development of components for solid boosters necessary to incorporate environmentally acceptable propellant. (\$2,743K) - (U) Analyze operating conditions created when firing environmentally safe propellants, and identify all components affected by the storing and firing of these new, environmentally acceptable propellants. <p>(U) <u>FY 1996:</u> Not Applicable.</p>													

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February 1995

BUDGET ACTIVITY

3 - Advanced Development

PE NUMBER AND TITLE

0603302F Space and Missile Rocket Propulsion

PROJECT

6341

(U) FY 1997: Not Applicable.

(U) B. Program Change Summary (\$ in Thousands):

	FY 1994	FY 1995	FY 1996	FY 1997	Total
	4,297	5,310	5,414	5,275	Cost
	4,297	7,656	0	0	Cont
					Cont

(U) Previous President's Budget
(U) Current President's Budget

(U) Change Summary Explanation:

Funding: Booster propulsion technology combined in Project 4373. FY 1995 increase reflects Congressional add.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0602601F, Phillips Laboratory.
- (U) This project has been coordinated th

(U) D. Schedule Profile: Not Applicable.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE
February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

3 - Advanced Development

0603311F Ballistic Missiles Technology

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	20,495	4,939	3,085	3,184	3,284	3,383	3,482	3,581	Continuing	Continuing
4091 Missile Electronics	19,889	4,900	3,085	3,184	3,284	3,383	3,482	3,581	Continuing	Continuing
4092 Reentry Vehicle Technology	606	39	0	0	0	0	0	0	0	TBD

(U) A. Mission Description and Budget Item Justification: This Advanced Development program develops and demonstrates ballistic missile technologies in the areas of guidance and control and reentry vehicles, and range instrumentation and safety for existing and future intercontinental ballistic missile (ICBM) systems and subsystems. The decline of the Soviet threat dramatically reoriented this program element. Near-term emphasis is on technologies which provide low-cost, low-maintenance, increased reliability, and increased safety of the currently deployed ICBM force. Through the Ballistic Missile Technology (BMT) program, the Air Force performs technology trade offs, develops brassboard hardware, and conducts ground and flight testing. The BMT program maintains technological superiority, thereby, maintaining U.S. security options within a changing global environment. This program integrates individual components into subsystems to demonstrate technology. All efforts in this program element contain the resources necessary, including civilian salaries, to manage, conduct, and document the technical activities.

(U) B. Program Change Summary (\$ in Thousands):

	FY 1994	FY 1995	FY 1996	FY 1997	Total Cost Cont
(U) Previous President's Budget	20,784	10,000	10,259	15,538	
(U) Appropriated Value	20,900	5,000			
(U) Adjustments to Appropriated Value					
a. Congressional General Reductions	-116	-61			
b. SBIR	-289				
(U) Current Budget Submit/President's Budget	20,495	4,939	3,085	3,184	Cont

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	
3 - Advanced Development	0603311F Ballistic Missiles Technology	
<p>(U) Change Summary Explanation: Funding: Change reflects the reduced Air Force emphasis on intercontinental ballistic missile weapons development.</p> <p>Schedule: Not Applicable.</p> <p>Technical: Not Applicable.</p> <p>(U) C. <u>Other Program Funding Summary</u>: Not Applicable.</p> <p>(U) D. <u>Schedule Profile</u>: Not Applicable.</p>		

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DATE

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BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

3 - Advanced Development

0603311F Ballistic Missiles Technology

4091

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
4091 Missile Electronics	19,889	4,900	3,085	3,184	3,284	3,383	3,482	3,581	Continuing	Continuing

(U) **A. Mission Description and Budget Item Justification:** The current focus of the Missile Electronics project is to develop and demonstrate technologies which dramatically reduce acquisition and support costs of advanced guidance for existing and future intercontinental ballistic missiles (ICBM) while maintaining present day accuracies. This project investigates and pursues technologies to improve the guidance, electronics, and power subsystems of existing and future missiles, and leverages ongoing advanced tactical precision navigation projects to extend their capabilities to support global reach/global power.

(U) FY 1994:

- (U) Continued development of advanced boost guidance technology to reduce current operations costs and improve reliability and maintainability of existing systems. (\$19,889K)
- (U) Complete the Advanced Inertial Measurement System design to improve reliability and supportability of existing and future ICBMs.

(U) FY 1995:

- (U) Continue development of advanced boost guidance technology to reduce current operations costs and improve reliability and maintainability of existing systems. (\$1,000K)
- (U) Develop, integrate, and test advanced solid state navigation technology for ICBM applications.
- (U) Continue development of advanced navigation technology to support range instrumentation and safety requirements. (\$3,900K)
- (U) Develop, integrate, and test Global Positioning System (GPS)-based systems which will enhance metrics and range safety.

(U) FY 1996:

- (U) Continue development of advanced boost guidance technology to reduce current operations costs and improve reliability and maintainability of existing systems. (\$1,000K)
- (U) Develop, integrate, and test advanced solid state navigation technology for ICBM applications.
- (U) Continue development of advanced navigation technology to support range instrumentation and safety requirements. (\$2,085K)
- (U) Develop, integrate, and test GPS-based navigation systems that enhance range metrics and safety for ICBM flight testing.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	PROJECT																		
BUDGET ACTIVITY		February 1995	4091																		
3 - Advanced Development		PE NUMBER AND TITLE	0603311F Ballistic Missiles Technology																		
<p>(U) <u>FY 1997:</u></p> <ul style="list-style-type: none"> (U) Continue development of advanced boost guidance technology to reduce current operations costs and improve reliability and maintainability of existing systems. (\$1,000K) <ul style="list-style-type: none"> (U) Develop, integrate, and test advanced solid state navigation technology for intercontinental ballistic missiles (ICBM) applications. (U) Continue development of advanced navigation technology to support range instrumentation and safety requirements. (\$2,184K) <ul style="list-style-type: none"> (U) Develop, integrate, and test Global Positioning System-based navigation systems that enhance range metrics and safety for ICBM flight testing. 																					
<p>(U) <u>B. Program Change Summary (\$ in Thousands):</u></p> <table border="1"> <thead> <tr> <th></th> <th>FY 1994</th> <th>FY 1995</th> <th>FY 1996</th> <th>FY 1997</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>(U) Previous President's Budget</td> <td>19,889</td> <td>4,900</td> <td>5,259</td> <td>10,538</td> <td>Cost</td> </tr> <tr> <td>(U) Current President's Budget</td> <td>19,889</td> <td>4,900</td> <td>3,085</td> <td>3,184</td> <td>Cont</td> </tr> </tbody> </table>					FY 1994	FY 1995	FY 1996	FY 1997	Total	(U) Previous President's Budget	19,889	4,900	5,259	10,538	Cost	(U) Current President's Budget	19,889	4,900	3,085	3,184	Cont
	FY 1994	FY 1995	FY 1996	FY 1997	Total																
(U) Previous President's Budget	19,889	4,900	5,259	10,538	Cost																
(U) Current President's Budget	19,889	4,900	3,085	3,184	Cont																
<p>(U) Change Summary Explanation:</p> <p>Funding: Change reflects the reduced Air Force emphasis on ICBM weapons development.</p> <p>Schedule: Not Applicable.</p> <p>Technical: Not Applicable.</p>																					
<p>(U) <u>C. Other Program Funding Summary:</u></p> <p>(U) <u>Related Activities:</u></p> <ul style="list-style-type: none"> (U) PE 0602204F, Aerospace Avionics. (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication. 																					
<p>(U) <u>D. Schedule Profile:</u> Not Applicable.</p>																					

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

3 - Advanced Development

0603311F Ballistic Missiles Technology

4092

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
4092 Reentry Vehicle Technology	606	39	0	0	0	0	0	0	0	TBD

(U) A. Mission Description and Budget Item Justification: This project develops reentry phenomenology which involves understanding the ionized plasma sheath around a reentry vehicle, ablative material needs, and aerodynamic performance characteristics.

(U) FY 1994:

- (U) Continued analyzing penetration tactics and options for defeating current and projected anti-ballistic missile threats. (\$200K)
- (U) Continued development of reentry vehicle phenomenology to support global reach/global power. (\$406K)
 - (U) Tested ablative materials for advanced reentry vehicle concepts.
 - (U) Developed and validated plasma models for reentry vehicle design

(U) FY 1995:

- (U) Continue analyzing penetration tactics and options for defeating current and projected antiballistic missile threats. (\$39K)
 - (U) Complete testing of ablative material for advanced reentry vehicle concepts.

(U) FY 1996: Not Applicable.

(U) FY 1997: Not Applicable.

(U) B. Program Change Summary (\$ in Thousands):

	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>	Total
(U) Previous President's Budget	895	5,100	5,000	5,000	Cost
(U) Current President's Budget	606	39	0	0	Cont
					TBD

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - Advanced Development	0603311F Ballistic Missiles Technology	4092

(U) Change Summary Explanation:
Funding: Project is terminated after FY 1995 due to the reduced Air Force emphasis on intercontinental ballistic missile reentry vehicle development.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0602102F, Materials.
- (U) PE 0602201F, Flight Dynamics.
- (U) PE 0602203F, Aerospace Propulsion and Power.
- (U) PE 0602204F, Aerospace Avionics.
- (U) PE 0602601F, Phillips Laboratory.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

(U) D. Schedule Profile: Not Applicable.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

4 - DEMONSTRATION AND VALIDATION

0603319F Airborne Laser Demonstrator

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	1881	19303	19954	19954	0	0	0	0	0	61853
0 4269	1881	19303	19954	19954	0	0	0	0	0	61853

(U) A. Mission Description and Budget Item Justification

(U) The Airborne Laser (ABL) program will demonstrate all necessary technologies required for acquiring, tracking, and killing Theater Ballistic Missiles in the boost phase. The Air Force approved program is a two-phased effort. Phase I involves award of two competing concept design contracts (FY 1994-1997) which were awarded in May 1994. The program will down-select to a single contractor in FY 1997 who will build and test the winning ABL Demonstrator design (Phase II). Phase II will be performed in two parts: Phase IIA is a one-year effort beginning in January 1997 and continuing through the Preliminary Design Review (PDR) in January 1998; Phase IIB begins after the completion of Phase IIA in January 1998 and culminates in FY 2001 with lethality demonstrations against boosting Theater Ballistic Missiles. The Phase II effort must demonstrate all key technologies for a fully operational system, allowing the Air Force to advance to EMD/Production in the FY 2001 time frame should the Air Force decide to proceed with an operational fleet of ABLs. Phase II will begin only if results of Phase I allow the program to pass exit criteria dealing with physics and engineering-related issues. During Phase I, the ABL leverages off laser and imaging technologies in PE 0603605F as well as the High Altitude Balloon Experiment (currently BMDO funded), which is to validate key fire control and tracking technologies. Deliveries from Phase I are: full operational capability ABL designs; scalable/traceable ABL Demonstrator designs; contractor risk mitigation demonstrations to decrease Phase II engineering/aircraft integration risk; simulations in the Air Combat Command's (ACC) Theater Air Command and Control Simulation Facility (TACCSF); and ABL adjunct mission studies for (a) cruise missile defense, (b) protection of high value assets, (c) defensive counter-air, (d) BMC⁴I, (e) suppression of enemy air defenses, and (f) surveillance.

(U) Acquisition Strategy

(U) Phase I competing contracts include: (1) Boeing, Seattle WA (prime); Lockheed, Sunnyvale CA; TRW, Redondo Beach CA; and ITEK, Lexington MA (subcontractors), and (2) Rockwell, Canoga Park CA (prime); Hughes, Los Angeles CA; United Technologies Optical Systems, West Palm Beach FL; North American Aircraft, El Segundo CA; Strategic Defense Centers, Seal Beach CA; E-Systems, Greenville TX; IBM, Boulder CO and Gaithersburg MD; Unisys, Salt Lake City UT and Eagan MN; and Parsons, Pasadena CA (subcontractors). Government Integrated Product Teams include Phillips Laboratory ABL SPO, Lasers and Imaging Directorate, and Advanced Weapons and Survivability Directorate; Air Force Electronics Systems Center; Wright Laboratories; Air Combat Command; and US Army White Sands Missile Range.

(U) Project Justification Narrative

(U) FY 1994: Awarded dual 33 month competing ABL Concept Design contracts in May 1994.

- (U) Initiated design of airframe modifications, as well as the related hardware and software necessary to install and support the high energy laser and related subsystems into an existing 747 aircraft platform. (\$87)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)			DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT		
4 - DEMONSTRATION AND VALIDATION	0603319F Airborne Laser Demonstrator			
(U)	- (U) Initiated design of a high power laser including fuel handling or power generation subsystem and resonator optical benches/components. (\$248)			
(U)	- (U) Initiated design of a laser beam control subsystem to irradiate target with lethal energy density. (\$197)			
(U)	- (U) Initiated design of avionics, battle management, and fire control components. (\$40K)			
(U)	- (U) Initiated development of analytical models/computer codes to predict the performance of the ABL to include the aircraft, weapons, and command and control elements. (\$205)			
(U)	- (U) Provided government participation in government/contractor Integrated Product Teams to accomplish Integrated Product Development of tasks described above. (\$599)			
(U)	- (U) Provided ACC/Air Staff technical support for continued ABL requirements, operational concept, and COEA development. (\$425)			
(U)	- (U) Continued maturing of theater integration and ABL adjunct mission capabilities through active defense and BMC ⁴ I Integrated Product Teams and government modeling/simulation efforts such as the Theater Air Command and Control Simulation Facility (TACCSF). (\$60)			
(U)	- (U) Began government Phase II environmental impact studies. (\$20)			
(U)	FY 1995: Continue all efforts under Concept Design contracts begun in FY 1994 plus initiate additional tasks described below:			
(U)	- (U) Initiate contractor hardware/software demonstration to reduce engineering/aircraft integration risk for Phase II of the program. Results factor into Phase II downselect decision in FY 1997. (\$4400)			
(U)	- (U) Begin contractor modeling of their ABL design in TACCSF. Results factor into Phase II downselect decision in FY 1997. (\$200)			
(U)	- (U) Begin ABL adjunct mission studies described above. (\$180)			
(U)	- (U) Conduct Operational Concept and Preliminary Requirement Reviews with government. (\$6800)			
(U)	- (U) Continue design and conduct first incremental Demonstrator Concept Design Reviews with government. (\$3403)			
(U)	- (U) Begin government Phase II environmental impact studies. (\$475)			
(U)	- (U) Begin government Phase II test planning. (\$675)			
(U)	- (U) Support ACC/SMC/Air Staff in boost phase intercept COEA study development and requirements definition. (\$470)			
(U)	- (U) Provide government participation in contractors' Integrated Product Teams for Integrated Product Development of all contract tasks. (\$2400)			
(U)	- (U) Provide government system security engineering and facility utilization planning support to contractors. (\$380)			
(U)	FY 1996: Continue all efforts begun under Concept Design contracts in FY 1994/1995 and deliver preliminary ABL Demonstrator specifications. Complete those Concept Design deliverables summarized below.			
(U)	- (U) Continue hardware/software risk mitigation demonstrations for Phase II downselection decision. (\$6500)			
(U)	- (U) Continue initial contractor simulation modeling efforts in TACCSF for downselection decision. (\$200)			
(U)	- (U) Deliver final Demonstrator specifications for downselection evaluation. (\$3200)			
(U)	- (U) Prepare for final concept design review in FY 1997. (\$4500)			
(U)	- (U) Complete majority of ABL adjunct mission studies supporting COEA/study decision. (\$200)			
(U)	- (U) Government continues with detailed test planning for Phase II. (\$700)			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

4 - DEMONSTRATION AND VALIDATION

0603319F Airborne Laser Demonstrator

- (U) Government continues environmental impact study for Phase II. (\$1000)
- (U) Government completes facility utilization planning for Phase II. (\$200)
- (U) Government participates in IPTs with contractors to accomplish all tasks described above. (\$3454)

(U) FY 1997: Phase I of program completes in FY 1997 when all contract tasks begun in FY 1994/1995/1996 are completed.

- (U) Completion and delivery of final designs. (\$6600)
- (U) Conduct of final Concept Design Reviews. (\$2000)
- (U) Completion of all remaining contractor risk-mitigation demonstrations. (\$3300)
- (U) Completion of ABL adjunct mission studies. (\$100)
- (U) Government completes environmental impact study for Phase II. (\$50)
- (U) Completion of evaluation of all simulation and modeling efforts in TACCSF with government. (\$350)
- (U) Government completes detailed test planning for Phase II. (\$250)
- (U) Government participates in IPTs with contractors to accomplish all tasks. (\$4000)
- (U) Government completes evaluation of competing Phase II proposals and completes active tracking experiments for concept design effort. (\$2854)

(U) B. Program Change Summary

\$ IN THOUSANDS

	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>	Total Cost
(U) Previous President's Budget	1945	20000	20000	20000	61954
(U) Appropriated Value	1945	20000	20000		
(U) Adjustments to Appropriated Value					
a. (U) Small Business Innovative Research	-27	-374			
b. (U) Below Threshold Reprogramming	-26				
c. (U) Congressional Reduction	-11	-323			
d. (U) General Reduction			-46	-46	
(U) Adjustment To Budget Years Since FY95 PB			19954	19954	
(U) Current Budget Submit/President's Budget	1881	19303	19954	19954	61092

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE _____

February 1995

BUDGET ACTIVITY

4 - DEMONSTRATION AND VALIDATION

PE NUMBER AND TITLE

0603319F Airborne Laser Demonstrator

PROJECT

0

COST (In Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
0	4269	1881	19303	19954	19954	0	0	0	0	0	61853

(U) C. Other Program Funding Summary

(U) PE 0603605F Advanced Weapons	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	To <u>Compl</u>	Total Cost
	15950	12388	8300	11750	-	-	-	-		48400

(U) PE 0603217C BMD Advanced Development

(U) D. Schedule Profile

	FY 1994	FY 1995	FY 1996	FY 1997
(U) Airborne Laser Concept Design Contract Awards	1 2 3 *	4 1 2 3	4 1 2 3	4 1 2 3
(U) Preliminary Requirements Review (PRR)	*	*		
(U) Conceptual Design Review 1		X		
(U) Demonstrator Request for Purchase (RFP) Release			X	
(U) Conceptual Design Review 2				
(U) Downselect winning Concept Design contractor for Demonstrator (Phase II)			X	X

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

February 1995

PE NUMBER AND TITLE

0603319F Airborne Laser Demonstrator

0

FY 1994	800	FY 1995	14983	FY 1996	14600	FY 1997	12000
	360		1620		2525		2160
	785		2780		2829		5794
	1945		19303		19954		19954

Performing Organizations

Project	Total
Office	Prior to
EAC	FY 1994

Account Name	Account Type	Account Number	Account Balance	Account Status
Rockwell Int	CPFF	9 May 94	61945	400
Conoga Park, CA			61945	400
			7700	7300
			6000	0
			21400	0

Boeing Defense & Space Group	CPFF	9 May 94	61945	400	7700	7300	6000	21400
Seattle, WA								

Support Contracts	360	1700	2525	2160	6745
In House/Misc Sup	785	2900	2829	5794	9437

Exhibit R-3

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE		PROJECT	
4 - DEMONSTRATION AND VALIDATION		0603319F Airborne Laser Demonstrator		0	
Government Furnished Property		NOT APPLICABLE			
Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1994	Total Budget to Complete FY 1997
Product Development Property					
Support and Management Property					
Test and Evaluation Property					
Subtotal Product Development					
Subtotal Support and Management					
Subtotal Test and Evaluation					
Total Project					

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE									
3 - Advanced Development		0603401F Advanced Spacecraft Technology									
COST (In Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost		19,900	48,291	32,627	36,443	40,941	45,780	49,640	51,753	Continuing	Continuing
0003 Reusable Launch Vehicle Technology		0	29,223	0	0	0	0	0	0	0	29,223
1026 Space Structures and Controls Technology		0	600	1,200	1,200	2,000	2,800	3,600	4,354	Continuing	Continuing
2181 Space Electronics and Software Technology		10,984	10,068	11,527	11,527	12,300	12,422	12,760	12,902	Continuing	Continuing
3784 Space Sensors and Satellite Communications Technology		0	700	2,700	2,700	3,000	3,500	4,000	4,700	Continuing	Continuing
3834 Space Technology Integration and Demonstration		4,672	3,300	8,500	12,967	15,442	17,913	19,355	19,500	Continuing	Continuing
4400 Space Control and Satellite Survivability Technology		0	0	3,200	2,549	2,199	2,345	2,425	2,497	Continuing	Continuing
682J Space Power and Thermal Management Technology		4,244	4,400	5,500	5,500	6,000	6,800	7,500	7,800	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification: This Advanced Development program develops and demonstrates advanced spacecraft technologies including integrated space, ground, and flight demonstrations. The broad goal is to decrease innovative space technology transition time and reduce the associated development costs and risks of future space-based systems. Efforts are focused on five high payoff space technology areas: advanced space structures and structural controls; hardened space electronics and satellite control software; advanced passive/active space-based sensors and satellite communications; compact, low-cost, space power and thermal management; and satellite survivability. All efforts in this program element contain the resources necessary, including civilian salaries, to manage, conduct, and document the listed technical activities.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

February 1995

PE NUMBER AND TITLE

0603401F Advanced Spacecraft Technology

	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>	<u>Total</u>
(U) Previous President's Budget	20,459	24,200	26,730	32,863	<u>Cost</u> Cont

(U) **D. Schedule Profile:** Not Applicable.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

BUDGET ACTIVITY		PE NUMBER AND TITLE										DATE	PROJECT
3 - Advanced Development		0603401F Advanced Spacecraft Technology										February 1995	0003
COST (In Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost		
0003 Reusable Launch Vehicle Technology		0	29,223	0	0	0	0	0	0	0	29,223		

(U) **A. Mission Description and Budget Item Justification:** This project accounts for the FY 1995 Congressional add for Reusable (space) Launch Vehicle (RLV) technology development. Accompanying Congressional direction stipulated funds were to support the ongoing National Aeronautics and Space Administration (NASA) single-stage-to-orbit (SSTO) vehicle program. This Air Force RLV technology project directly complements and fully supports the NASA-led RLV program and has been coordinated and approved through NASA Headquarters. The tasks identified in this project summary represent the DoD equity in RLV technology development as recommended by the Space Launch Modernization Plan (SLMP) study and do not incur any outyear funding commitment except as budgeted in PE 0603302F, Project 0003. This project will be moved in FY 1996 to PE 0603302F, Space and Missile Rocket Propulsion Technology, and the title revised to Launch Vehicle Technologies.

(U) FY 1994: Not Applicable.

(U) FY 1995:

- (U) Apply advanced rocket propulsion technology to reusable launch vehicles. (\$11,643K)
- (U) Modify the design of the Integrated Power-Head (IPHD) pre-burner components.
- (U) Demonstrate application of the advanced long life turbopump fluid film bearing technologies to reusable launch vehicles.
- (U) Investigate high performance thrust cell unconventional nozzles and fundamental technologies.
- (U) Perform advanced reusable launch vehicle structures/tankage technology development. (\$10,670K)
- (U) Design and demonstrate lightweight, reusable launch vehicle structures.
- (U) Design and demonstrate reusable launch vehicle (RLV) composite, cryogenic propellant tanks.
- (U) Perform advanced reusable launch vehicle thermal protection system technology development. (\$2,910K)
- (U) Design and demonstrate lightweight, reusable, maintainable and affordable thermal protection system critical technologies.
- (U) Perform advanced reusable launch vehicle operations technology development. (\$1,000K)
- (U) Develop and demonstrate reliable, cost effective reusable launch vehicle (RLV) ground and flight operations.
- (U) Perform advanced reusable launch vehicle high density propellant technology demonstration. (\$3,000K)
- (U) Investigate application of high density, high mass fraction propellant technologies to reusable launch vehicles.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1995																		
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT																			
3 - Advanced Development	0603401F Advanced Spacecraft Technology	0003																			
<p>(U) <u>FY 1996</u>: Not Applicable.</p> <p>(U) <u>FY 1997</u>: Not Applicable.</p> <p>(U) B. Program Change Summary (\$ in Thousands):</p> <table border="1"> <thead> <tr> <th></th> <th><u>FY 1994</u></th> <th><u>FY 1995</u></th> <th><u>FY 1996</u></th> <th><u>FY 1997</u></th> <th>Total Cost</th> </tr> </thead> <tbody> <tr> <td>(U) Previous President's Budget</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>(U) Current President's Budget</td> <td>0</td> <td>29,223</td> <td>0</td> <td>0</td> <td>29,223</td> </tr> </tbody> </table> <p>(U) Change Summary Explanation: Funding: Budget reflects Congressional add in FY 1995.</p> <p>Schedule: Not Applicable.</p> <p>Technical: Not Applicable.</p> <p>(U) C. Other Program Funding Summary:</p> <p>(U) Related Activities:</p> <ul style="list-style-type: none"> - (U) PE 0602102F, Materials. - (U) PE 0602269F, Hypersonic Technology Program. - (U) PE 0602601F, Phillips Laboratory. - (U) PE 0603302F, Space and Missile Rocket Propulsion Technology. - (U) PE 0603853F, Evolved Expendable Launch Vehicle Program. - (U) UPN 242, NASA Reusable Launch Vehicle Program. - (U) This project has been coordinated through the Project Reliance process and with NASA to harmonize efforts and eliminate duplication. <p>(U) D. Schedule Profile: Not Applicable.</p>					<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>	Total Cost	(U) Previous President's Budget	0	0	0	0	0	(U) Current President's Budget	0	29,223	0	0	29,223
	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>	Total Cost																
(U) Previous President's Budget	0	0	0	0	0																
(U) Current President's Budget	0	29,223	0	0	29,223																

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

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February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

3 - Advanced Development

0603401F Advanced Spacecraft Technology

1026

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
1026 Space Structures and Controls Technology	0	600	1,200	1,200	2,000	2,800	3,600	4,354	Continuing	Continuing

(U) **A. Mission Description and Budget Item Justification:** This project develops advanced composite structures and structural control technologies for future Air Force space and missile systems. Prior to FY 1995, the Air Force relied on Ballistic Missile Defense Organization (BMDO) funding to address its needs in this technology area. As BMDO budgets have declined, so has their funding in this area, necessitating Air Force investment to maintain critical spacecraft structures and controls technologies. Advanced space structure component efforts focus on the demonstration of new composite structure technologies whose goal is to significantly improve the payload mass fraction and shorten overall spacecraft fabrication time and cost. This project also develops advanced passive and active spacecraft structural control technologies. Structure vibration and shock suppression technologies are intended to significantly enhance space platform stability, improving the focusing/imaging ability of space-based optical components such as focal plane arrays developed in Project 3784 or solar cell arrays developed in Project 682J.

(U) FY 1994: Not Applicable.

(U) FY 1995:

- (U) Continue former BMDO advanced composite space vehicle structure technology development. (\$300K)
- (U) Complete design of all-composite satellite bus technology demonstrator to be flown on MightySat-1.
- (U) Continue former BMDO advanced spacecraft structural control technology development. (\$300K)
- (U) Complete non-pyrotechnic release device technology hardware fabrication.

(U) FY 1996:

- (U) Continue advanced composite spacecraft structures technology development. (\$600K)
- (U) Complete fabrication of the all-composite satellite bus technology demonstration to be flown on MightySat-1, showing 30-50% weight savings.
- (U) Continue advanced spacecraft structural controls technology development. (\$600K)
- (U) Assemble the non-pyrotechnic release device technology demonstration experiment to be flown on MightySat-1.

(U) FY 1997:

- (U) Continue advanced composite spacecraft structures technology development. (\$600K)
- (U) Demonstrate preliminary design of the next generation composite satellite bus for future space applications like the MilSatCom program.
- (U) Continue advanced spacecraft structural controls technology development. (\$600K)
- (U) Initiate launch vibration isolation technology demonstration program.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
3 - Advanced Development	0603401F Advanced Spacecraft Technology	1026	
(U) B. <u>Program Change Summary (\$ in Thousands):</u>			
(U) Previous President's Budget	FY 1994	FY 1995	FY 1996
(U) Current President's Budget	0	600	1,200
	0	600	1,200
(U) Change Summary Explanation:			
Funding: This project started in FY 1995 to continue former Ballistic Missile Defense Organization funded efforts critical to the Air Force.			
Schedule: Not Applicable.			
Technical: Not Applicable.			
(U) C. <u>Other Program Funding Summary:</u>			
(U) Related Activities:			
- (U) PE 0602102F, Materials.			
- (U) PE 0602601F, Phillips Laboratory.			
- (U) PE 0603218C, Research and Support.			
- (U) PE 0603302F, Space and Missile Rocket Propulsion Technology.			
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.			
(U) D. <u>Schedule Profile:</u> Not Applicable.			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE
February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

3 - Advanced Development

0603401F Advanced Spacecraft Technology

2181

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
2181 Space Electronics and Software Technology	10,984	10,068	11,527	11,527	12,300	12,422	12,760	12,902	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification: This project develops, demonstrates, and evaluates hardware, software, and modeling/simulation technologies, enabling interchangeable, interoperable, and standardized data and signal processing for existing and future Air Force space and missile systems. This project will demonstrate the capability to produce space-qualified, Very High Speed Integrated Circuit (VHSIC)-based components, wafer scale integration (WSI) packages, electronic processors, and reusable standardized satellite control software. In the near-term, this project concentrates on converting (e.g., hardening) commercial data and signal processor technologies for use in Air Force space and missile systems. Advanced electronic packaging technologies, reducing weight and volume, are being developed for broad military space applications. This project develops and demonstrates space data processor technologies like the Advanced Technology Insertion Module (ATIM) (32-bit) technology. The Advanced Spaceborne Computer Module (ASCM), ATIM's 16-bit predecessor, is currently baselined into 65 DoD, NASA, and commercial programs. This project develops and demonstrates space signal processor technologies like the Hardened Ada Signal Processor (HASP) program. It also develops low-cost, easily modifiable software and hardware architectures for ground control, satellite components, and autonomous satellite operations. The Multi-mission Advanced Ground Intelligent Control (MAGIC) program has developed a low-cost, flexible architecture for satellite control and mission operations. In the long-term, this project focuses on developing an integrated avionics-like architecture for satellites where high-speed data busses centralize many of the functions now scattered about the spacecraft. Additionally, this project develops very low-power electronics allowing dramatic size, weight, and power reductions for future Air Force space applications.

(U) FY 1994:

- (U) Continued development of space-qualified, advanced low-power, hardened data processors and memory technologies. (\$8,684K)
- (U) Completed advanced technology insertion module fault tolerance demonstration.
- (U) Completed advanced technology insertion module preliminary design reviews for single board computer fabrication and test.
- (U) Completed design and began fabricating Rad-6000 single chip hardened processor.
- (U) Demonstrated fully fault tolerant 16-bit space computer system which recovered from 45 consecutively inserted faults. (\$500K)
- (U) Continued development of space-qualified, hardened signal processor electronics technologies and standard electronic devices. (\$500K)
- (U) Completed hardened Ada signal processor single chip design and 92% of layout.
- (U) Investigated alternate silicon on insulator digital signal processor potential sources for space.
- (U) Continued space-qualified, advanced mixed-signal electronics packaging technology development, using commercial technology base. (\$700K)
- (U) Fabricated enough multi-chip memory modules to demonstrate a space-qualified solid state recorder technology for magnetic tape replacement.
- (U) Completed analog signal processing module fabrication, demonstrating the technical feasibility of mixed multi-chip modules for space.
- (U) Delivered advanced technology multi-chip module anti-jam filters.

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)			DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE	PROJECT	
3 - Advanced Development		0603401F Advanced Spacecraft Technology	2181	
-	(U)	Continued development of astrodynamics routines and reusable, space standardized software technologies. (\$600K)		
-	(U)	Completed continuous thrust orbit transfer analysis and started continuous thrust orbit relocation technology study.		
-	(U)	Ported a research version of the Goddard trajectory determination system on a personal computer (PC), resulting in the successful transition of 150,000 lines of mainframe computer code to a PC.		
-	(U)	Defined and demonstrated a visual interface for satellite telemetry analysis; first step of the multi-mission advanced ground intelligent control program.		
-	(U)	Expanded reusable software architecture for on-board satellite processing domain analysis for use with Defense Meteorological Support Program and GE A2100 satellites including the communication and electrical power subsystems.		
-	(U)	Continued development of space-qualifiable accelerated insertion of standard microelectronics components. (\$500K)		
-	(U)	Modified commercial integrated circuits so they can be fabricated on space-qualified manufacturing lines.		
(U) FY 1995:				
-	(U)	Continue development of space-qualifiable, advanced low-power, hardened data processors and memory technologies. (\$6,968K)		
-	(U)	Design and fabricate processor chipsets and other integrated circuits to provide complete core chipset for advanced technology space computer.		
-	(U)	Fabricate a breadboard and test functionality of full computer and operating system software.		
-	(U)	Continue development of space-qualifiable, hardened signal processor electronics technologies and standard electronic devices. (\$1,000K)		
-	(U)	Purchase license to fabricate a space-qualifiable version of a commercial digital signal processor design.		
-	(U)	Initiate transfer of a commercial digital signal processor to a space-qualified integrated circuit manufacturing line.		
-	(U)	Continue space-qualifiable, advanced mixed-signal electronics packaging technology development, using commercial technology base. (\$600K)		
-	(U)	Complete high-speed, single layer computer for three-dimensional integrated sensor processor.		
-	(U)	Develop robust analog processor multi-chip module and brassboard for space flight, demonstrating advanced packaging reliability.		
-	(U)	Continue development of reusable, space standardized software technologies. (\$600K)		
-	(U)	Complete multi-mission advanced ground intelligent control telemetry analysis development and test.		
-	(U)	Enhance multi-mission advanced ground intelligent control to provide assistance to satellite operators in anomaly resolution.		
-	(U)	Enhance multi-mission advanced ground intelligent control to include satellite commanding.		
-	(U)	Continue development of space-qualifiable accelerated insertion of standard microelectronics components. (\$900K)		
-	(U)	Transfer commercial field programmable gate array to a space-qualified integrated circuit manufacturing line.		
-	(U)	Fabricate and ground test space-qualifiable 8,000 gate, field programmable gate array.		
(U) FY 1996:				
-	(U)	Continue development of space-qualifiable, advanced low-power, hardened data processors and memory technologies. (\$7,127K)		
-	(U)	Fabricate engineering model of standard satellite computer to demonstrate functionality and performance of data processors.		
-	(U)	Develop full capability operating system and applications software environment using desktop computer and hardware-in-the-loop.		

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Exhibit B-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
3 - Advanced Development	0603401F Advanced Spacecraft Technology	2181	
-	(U) Continue development of space-qualifiable, hardened signal processor electronics technologies and standard electronic devices. (\$1,100K)		
-	(U) Fabricate Digital Signal Processor in bulk Silicon.		
-	(U) Demonstrate functionality and performance of space-qualifiable digital signal processor using commercial hardware/software tools.		
-	(U) Continue space-qualifiable, advanced mixed-signal electronics packaging technology development using commercial technology base. (\$1,300K)		
-	(U) Demonstrate two times increase in density and decrease in cost to space qualify high density interconnect technology.		
-	(U) Integrate plastic/non-hermetic and three-dimensional (3-D) packaging technologies into a space demonstration.		
-	(U) Continue development of reusable, space standardized software technologies. (\$1,000K)		
-	(U) Enhance multi-mission advanced ground intelligent control software to include independent decision making capability.		
-	(U) Develop a realistic training environment for ground spacecraft operators.		
-	(U) Continue development of space-qualifiable accelerated insertion of standard microelectronics components. (\$1,000K)		
-	(U) Fabricate and ground test space-qualifiable 2,000 field programmable gate arrays.		
-	(U) Start demonstrating programmability of 8,000 field programmable gate array using commercial hardware/software tools.		
(U)	FY 1997:		
-	(U) Continue development of space-qualifiable, advanced low-power, hardened data processors and memory technologies. (\$7,527K)		
-	(U) Fabricate space-qualifiable configuration of 32-bit processor-based computers and demonstrate the full range of performance capabilities.		
-	(U) Initiate design of advanced high throughput, low-power data processor-based on commercial technology base.		
-	(U) Continue development of space-qualifiable, hardened signal processor electronics technologies. (\$800K)		
-	(U) Fabricate silicon on insulator (SOI) version of space-qualifiable digital signal processor.		
-	(U) Evaluate the ability of both bulk silicon and SOI version of the digital signal processor to perform in the space environment.		
-	(U) Continue space-qualifiable, advanced mixed signal electronics packaging technology development such as 3-D wafer scale integration. (\$1,400K)		
-	(U) Demonstrate integrated sensor processing 3-D electronics assembly in robust space-qualifiable configuration.		
-	(U) Demonstrate improved multi-chip module technology by constructing a complex multi-processor system.		
-	(U) Continue development of reusable, space standardized software technologies. (\$1,100K)		
-	(U) Add the ability to assist in the identification and resolution of unknown anomalies in multi-mission advanced ground intelligent control software.		
-	(U) Analyze capabilities that can be integrated into autonomous satellite operations.		
-	(U) Continue development of space-qualifiable accelerated insertion of standard electronics. (\$700K)		
-	(U) Complete programmability demonstration of both 8,000 and 2,000 gate, field programmable gate arrays.		
-	(U) Evaluate the functionality, performance, and ability of both the 8,000 and 2,000 gate, field programmable gate arrays to perform in space environment.		

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Exhibit R-2

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE	PROJECT
3 - Advanced Development		0603401F Advanced Spacecraft Technology	2181
(U) B. <u>Program Change Summary (\$ in Thousands):</u>			
(U) Previous President's Budget	FY 1994	FY 1995	FY 1996
(U) Current President's Budget	11,171	10,300	10,400
	10,984	10,068	11,527
			FY 1997
			10,800
			11,527
			Cont
			Cont
(U) Change Summary Explanation:			
Funding: Changes reflect increased Air Force priority on space-related Science and Technology.			
Schedule: Not Applicable.			
Technical: Not Applicable.			
(U) C. <u>Other Program Funding Summary:</u>			
(U) Related Activities:			
-	(U) PE 0303601F, MILSTAR Satellite Communications System.		
-	(U) PE 0305160F, Defense Meteorological Satellite Program (DMSP).		
-	(U) PE 0602601F, Phillips Laboratory.		
-	(U) PE 0603311F, Ballistic Missile Technology.		
-	(U) PE 0603215C, Limited Defense System.		
-	(U) PE 0603218C, Research and Support.		
-	(U) PE 0603226E, Experimental Evaluation of Major Innovative Technologies.		
-	(U) PE 0604609F, Reliability and Maintainability Technology Insertion Program (RAMTIP).		
-	(U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.		
(U) D. <u>Schedule Profile:</u> Not Applicable.			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

3 - Advanced Development

0603401F Advanced Spacecraft Technology

3784

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
3784 Space Sensors and Satellite Communications Technology	0	700	2,700	2,700	3,000	3,500	4,000	4,700	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification: This project was refocused last year because of previous Congressional actions on the 60 GHz Hertz (GHz) communication work and because the Air Force is assuming responsibility for spaceborne passive sensors from the Ballistic Missile Defense Organization (BMDO). This project develops military space-based ground surveillance and satellite communication technologies. The project focuses on advancing space-based application of commercial sensors and communication technologies while improving performance, schedule, maturity, cost, and/or risk to future Air Force systems. The primary focus of the sensor efforts is to meet spaceborne sensor needs for theater missile defense. The focus of the satellite communication effort is to develop radio frequency (RF) and laser technologies for future military intra-space and space-ground communication systems. This project seeks to improve affordability, reliability, and performance while significantly reducing space sensor and satellite communication size, weight, cost, cooling, and power requirements.

(U) FY 1994: Not Applicable.

(U) FY 1995:

- (U) Continue former BMDO space-based reconnaissance/surveillance passive sensor technology meeting Air Force high priority needs. (\$700K)
- (U) Initiate and complete design and fabrication of large format focal plane array for mid-wave infrared applications.

(U) FY 1996:

- (U) Continue space-based reconnaissance/surveillance sensor technology meeting high priority Air Force needs. (\$2,400K)
- (U) Evaluate and deliver large format focal plane arrays for mid-wave infrared applications.
- (U) Complete passive sensor subsystem affordability analysis.
- (U) Evaluate performance of advanced signal processing algorithms for surveillance sensors.
- (U) Assess operational utility of candidate space-based surveillance technologies.
- (U) Develop satellite communication technology which supports space communications needs. (\$300K)
- (U) Develop ultra-lightweight radio frequency crosslink subsystem component technology.
- (U) Assess commercial communication technology for transition to military systems.

(U) FY 1997:

- (U) Continue space-based reconnaissance/surveillance sensor technology meeting Air Force high priority needs. (\$2,400K)
- (U) Initiate design study for dual-band space-based reconnaissance sensors for missile defense applications.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
3 - Advanced Development	0603401F Advanced Spacecraft Technology	3784	
<ul style="list-style-type: none"> - (U) Investigate efforts to increase yield and reliability of large format infrared focal plane arrays. - (U) Evaluate performance of advanced signal processing algorithms for surveillance sensors. - (U) Assess operational utility of candidate space-based surveillance technologies. - (U) Develop satellite communication technology which supports space communications needs. (\$300K) - (U) Develop 150 megabit multi-mode modem technology. - (U) Assess commercial communication technology for transition to military systems. 			
(U) B. Program Change Summary (\$ in Thousands):			
		FY 1994	FY 1995
(U) Previous President's Budget		0	1,500
(U) Current President's Budget		0	700
			FY 1996
			2,700
			2,700
			FY 1997
			3,900
			2,700
			Total
			Cost
			Cont
			Cont
(U) Change Summary Explanation:			
Funding: The FY 1995 program continued former Ballistic Missile Defense Organization funded efforts critical to the Air Force. Changes reflect increased Air Force priority on various space-related Science and Technology efforts.			
Schedule: Not Applicable.			
Technical: Not Applicable.			
(U) C. Other Program Funding Summary:			
(U) Related Activities:			
- (U) PE 0303601F, MILSTAR Satellite Communications System.			
- (U) PE 0602601F, Phillips Laboratory.			
- (U) PE 0602702F, Command/Control/Communication Technology.			
- (U) PE 0603226E, Experimental Evaluation of Major Innovative Technologies.			
- (U) PE 0604711F, Extremely High Frequency Satellite Communications Research and Development.			
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.			
(U) D. Schedule Profile: Not Applicable.			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

3 - Advanced Development

0603401F Advanced Spacecraft Technology

3834

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
3834 Space Technology Integration and Demonstration	4,672	3,300	8,500	12,967	15,442	17,913	19,355	19,500	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification: This project integrates government and commercially developed technologies onto spacecraft and launch vehicles, demonstrating their value in addressing warfighter needs and in supporting the warfighter by defining new operational concepts, tactics procedures, and doctrine on the Integrated Space Technology Flight (ISTF) series. The highly successful Technology for Autonomous Operational Survivability (TAOS) program is the basis for the ISTF series. TAOS is the only DoD satellite autonomy and survivability demonstration. TAOS was launched in March 1994 and is currently demonstrating and validating advanced spaceborne computers, autonomous navigation hardware/software, laser sensors, radar sensors, advanced data buses, and other operational concepts. TAOS has allowed space system operators and users, for the first time, to conduct space exercises, directly leading to enhanced warfighter capabilities. In FY 1995, the space technology community is evaluating mission requirements and potential technology solutions in PE 0602601F, Project 8809. The results of this study will be used to determine the final ISTF-1 space technology flight demonstration composition. ISTF-1 will demonstrate those selected technologies showing the greatest potential to meet Air Force Space Command's (AFSPC's) highest priorities as compiled in their current Mission Area Plans (MAPs) and MAP Deficiency lists.

(U) FY 1994:

- (U) Launched the TAOS flight experiment. (\$2,600K)
- (U) Completed TAOS launch vehicle and spacecraft bus integration and assembly.
- (U) Conducted navigation, laser, and radar sensor experiments on-board the TAOS experiment.
- (U) Supported and participated in several major U.S. Space Command exercises using the TAOS spacecraft.
- (U) Began data analysis of technology for autonomous operational survivability experiment. (\$800K)
- (U) Initiated analysis of navigation, laser, and radar sensor data.
- (U) Analyzed major spacecraft anomalies and prepared recovery plan.
- (U) Began planning for next integrated space technology demonstration. (\$1,272K)
- (U) Completed briefing to industry for advanced space technology demonstration.
- (U) Established integrated teams with Headquarters Space and Missiles System Center at Los Angeles AFB, the Space Warfare Center at Falcon AFB, Air Force Space Command at Peterson AFB, and Phillips Laboratory at Kirtland AFB for an advanced space technology demonstration program.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	PROJECT
BUDGET ACTIVITY	PE NUMBER AND TITLE		
3 - Advanced Development	0603401F Advanced Spacecraft Technology	February 1995	3834
(U) FY 1995:			
-	(U) Complete the Technology for Autonomous Operational Survivability (TAOS) flight experiment. (\$2,300K)		
-	(U) Complete spacecraft anomaly recovery.		
-	(U) Complete exercises and assessments.		
-	(U) Complete navigation, laser, and radar sensor experimentation.		
-	(U) Perform TAOS post-mission analysis. (\$1,000K)		
-	(U) Conduct final technology (navigation, laser, and radar sensors) assessments and complete the draft final reports.		
(U) FY 1996:			
-	(U) Complete the TAOS post-mission analysis. (\$3,000K)		
-	(U) Complete TAOS mission data analysis and deliver final report.		
-	(U) De-orbit TAOS spacecraft, dispense mission unique equipment/software, and close out contract.		
-	(U) Begin Integrated Space Technology Flight (ISTF-1) development. (\$4,500K)		
-	(U) Conduct ISTF-1 preliminary design.		
-	(U) Complete ISTF-1 critical design.		
-	(U) Begin ISTF-1 long-lead time hardware procurement.		
-	(U) Develop modeling/simulation for integrated satellite payloads, mission utility, and system engineering analysis. (\$1,000K)		
-	(U) Complete satellite prototype and environmental effects simulation software interfaces and demonstrate real-time throughput.		
(U) FY 1997:			
-	(U) Continue ISTF-1 demonstration development. (\$10,967K)		
-	(U) Continue ISTF-1 long-lead time hardware procurement and fabrication.		
-	(U) Begin ISTF-1 payload hardware fabrication.		
-	(U) Start ISTF-1 payload module fabrication.		
-	(U) Perform requirements definition and technology studies to support ISTF-2. (\$1,000K)		
-	(U) Define concepts and technology objectives.		
-	(U) Develop modeling/simulation for integrated satellite payloads, mission utility, and system engineering analysis. (\$1,000K)		
-	(U) Establish real-time connectivity to synthetic operational test and evaluation environments.		

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

BUDGET ACTIVITY		DATE	PROJECT
3 - Advanced Development		February 1995	3834
(U) B. Program Change Summary (\$ in Thousands):		PE NUMBER AND TITLE 0603401F Advanced Spacecraft Technology	
		FY 1994	FY 1995
(U) Previous President's Budget		4,858	7,300
(U) Current President's Budget		4,672	3,300
		FY 1996	FY 1997
		7,730	10,700
		8,500	12,967
		Total	Cost
			Cont
			Cont
(U) Change Summary Explanation: Funding: Changes reflect increased Air Force priority on space-related Science and Technology.			
Schedule: Not Applicable.			
Technical: Not Applicable.			
(U) C. Other Program Funding Summary:			
(U) Related Activities:			
- (U) PE 0602601F, Phillips Laboratory.			
- (U) PE 0603402F, Space Test Program.			
- (U) PE 0603438F, Satellite Systems Survivability.			
- (U) PE 0604609F, Reliability and Maintainability Technology Insertion Program (RAMTIP).			
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.			
(U) D. Schedule Profile: Not Applicable.			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)									
DATE February 1995									
PROJECT 4400									
PE NUMBER AND TITLE									
0603401F Advanced Spacecraft Technology									
BUDGET ACTIVITY									
3 - Advanced Development									
COST (In Thousands)									
	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Total Cost
4400 Space Control and Satellite Survivability Technology	0	0	3,200	2,549	2,199	2,345	2,425	2,497	Continuing
<p>(U) <u>A. Mission Description and Budget Item Justification:</u> This project develops and demonstrates the technologies required to assure operation of U.S. space assets in hostile warfighting environments. It provides the resources necessary to perform threat susceptibility/vulnerability assessments of critical components, subsystems, and systems. This project also identifies and develop solutions to mitigate vulnerabilities. Further, it develops and demonstrates technology options to support balanced protection strategies to detect, avoid, and operate in hostile threat environments. Efforts under this project will be closely integrated with the core technologies development under Projects 1026, 2181, 3784, 682J, and, where appropriate, end products included in the demonstrations of Project 3834. This project assumes the Air Force's responsibility for spacecraft survivability technology from the Ballistic Missile Defense Organization (BMDO). Starting in FY 1996, PE 0603438F, Satellite Systems Survivability, was transferred to this PE as Project 4400.</p> <p>(U) <u>FY 1994:</u> Not Applicable.</p> <p>(U) <u>FY 1995:</u> Not Applicable.</p> <p>(U) <u>FY 1996:</u></p> <ul style="list-style-type: none"> - (U) Continue selected Directed Energy Weapon (DEW) threat environment susceptibility/vulnerability assessments on critical space-based sensor and communications subsystems. (\$925K) <ul style="list-style-type: none"> - (U) Perform sensor laser jamming model refinements and vulnerability assessments. - (U) Perform sensor radio frequency (RF) susceptibility evaluations. - (U) Perform communication subsystems disruption/degradation modeling and susceptibility evaluations. - (U) Initiate ground-based observations of spacecraft environmental interactions. - (U) Select candidate RF/high-powered microwave (HPM) detector technologies for threat warning sensor development. (\$2,200K) <ul style="list-style-type: none"> - (U) Develop miniaturized radar warning detector. - (U) Evaluate communication intrusion/interference detection technologies. - (U) Evaluate HPM detection concepts. - (U) Develop/integrate sensor signal processor design. - (U) Evaluate candidate DEW sensor jamming protection techniques for critical sensor optical components. (\$75K) <ul style="list-style-type: none"> - (U) Assess candidate RF mitigation techniques for optical sensors. 									

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
3 - Advanced Development	0603401F Advanced Spacecraft Technology	4400	
<p>(U) <u>FY 1997:</u></p> <ul style="list-style-type: none"> - (U) Continue multi-threat assessments on critical space assets and evaluate the potential susceptibilities of evolving technologies. (\$633K) - (U) Perform analytical and experimental verification of selected laser and radio frequency (RF) jamming sensor protection techniques. - (U) Perform analytical and experimental verification of RF interference mitigation techniques for advanced communication subsystems. - (U) Complete ground-based observations of spacecraft environmental interactions. - (U) Perform RF/high-powered microwave (HPM) threat warning sensors testing. (\$1,766K) - (U) Integrate radar warning, intrusion/interference, and HPM detector concepts. - (U) Optimize/integrate signal processor design. - (U) Integrate optimized antenna configuration. - (U) Test integrated RF/HPM threat warning sensor. - (U) Continue evaluating and demonstrating Defense Early Warning (DEW) sensor jamming protection techniques. (\$150K) - (U) Demonstrate communication subsystem front-end RF protection devices. 			
<p>(U) <u>B. Program Change Summary (\$ in Thousands):</u></p>			
(U) Previous President's Budget	FY 1994	FY 1995	FY 1996
(U) Current President's Budget	0	0	0
	0	0	3,200
			2,549
			Cont
(U) Change Summary Explanation:			
Funding: Starting in FY 1996, PE 0603438F, Satellite Systems Survivability, was transferred to this PE as Project 4400.			
Schedule: Not Applicable.			
Technical: Not Applicable.			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
3 - Advanced Development	0603401F Advanced Spacecraft Technology	4400	
<p>(U) C. <u>Other Program Funding Summary:</u></p> <ul style="list-style-type: none">(U) Related Activities:<ul style="list-style-type: none">- (U) PE 0602102F, Materials.- (U) PE 0602601F, Phillips Laboratory.- (U) PE 0603410F, Space Systems Environmental Interactions Technology.- (U) PE 0603438F, Satellite Systems Survivability.- (U) PE 0603605F, Advanced Weapons Technology.- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication. <p>(U) D. <u>Schedule Profile:</u> Not Applicable.</p>			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

3 - Advanced Development

0603401F Advanced Spacecraft Technology

682J

	COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
682J Space Power and Thermal Management Technology		4,244	4,400	5,500	5,500	6,000	6,800	7,500	7,800	Continuing	Continuing

(U) **A. Mission Description and Budget Item Justification:** This project develops and demonstrates compact, low-cost, spacecraft and ballistic missile power generation, storage, distribution, and thermal management technologies, including cryogenic cooling technologies. Power generation work focuses on lightweight, low-cost, low volume, and survivable solar cell arrays. Energy storage work focuses on lightweight nickel hydrogen (NiH₂) and sodium sulfur (NaS) spacecraft batteries for extended (five-ten year) satellite missions. Power distribution efforts focus on producing lightweight, high efficiency, standardized power busses for use on future Air Force space and missile programs. This project also develops and demonstrates the non-nuclear technologies associated with space nuclear power systems such as power conversion, conditioning, and power system thermal management. It investigates alternative technologies to increase space vehicle power subsystem performance, lifetime, survivability, and safety while reducing costs/risks. In FY 1995, this project assumed responsibility from the Ballistic Missile Defense Organization (BMDO) to develop spacecraft thermal management technologies such as cryogenic coolers necessary to maintain passive sensors in low optical backgrounds.

(U) FY 1994:

- (U) Continued development of space conventional power technologies such as advanced solar cell arrays. (\$1,200K)
- (U) Flight-qualified primary power (for the spacecraft) panels and experimental solar cell panels and integrated them onto a research satellite.
- (U) Recorded record efficiency rating for gallium indium phosphide /gallium arsenide solar cells with 24.2% energy conversion.
- (U) Demonstrated world record efficiency (9.3%) for copper-indium-diselenide solar cell on a flexible, electrically insulating substrate.
- (U) Continued development of space vehicle conventional power technologies such as compact volume/weight batteries. (\$2,400K)
- (U) Placed over 200 nickel hydrogen (NiH₂) batteries on test, achieving over 30,000 cycles.
- (U) Demonstrated sodium sulfur (NaS) batteries with 150 watt hour/kilogram power density on low earth orbit profile.
- (U) Developed standardized manufacturing, testing, and modeling procedures for nickel cadmium (NiCd) and NiH₂ cells.
- (U) Completed thermal vacuum and cycle testing of the integrated power panel.
- (U) Fabricated 85 watt fully populated (in solar cells) integrated power panels for ground- and flight-qualification.
- (U) Continued development of non-nuclear technologies associated with space nuclear power systems such as thermionics. (\$644K)
- (U) Characterized lithium heat pipe assembly for thermionic heat pipe module which indicated significantly reduced temperature asymmetries.
- (U) Vacuum tested an alkali metal thermal to electric conversion cell.
- (U) Completed characterization of the emitter heat pipe.

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
3 - Advanced Development	0603401F Advanced Spacecraft Technology	682J	
(U) FY 1995:			
-	(U) Continue development of space conventional power technologies such as advanced solar cell arrays. (\$1,100K).		
-	(U) Investigate addition of active germanium bottom cell to gallium indium phosphide /gallium arsenide dual-junction cell to boost efficiency to >26%.		
-	(U) Investigate all-back mounted electrical contact, thin gallium arsenide cells for improved efficiency and system integration.		
-	(U) Continue development of space vehicle conventional power technologies such as compact volume/weight batteries. (\$2,100K)		
-	(U) Complete abuse testing of sodium sulfur cells for flight test in FY 1996.		
-	(U) Conduct solid state primary battery development program for launch vehicle applications.		
-	(U) Initiate life test verification of nickel hydrogen battery first in a two-cell pressure vessel then in operationally more realistic 22-cell.		
-	(U) Continue development of non-nuclear technologies associated with space nuclear power systems such as thermionics technology. (\$600K)		
-	(U) Continue testing energy conversion technologies such as alkali-metal thermal to electric converter (AMTEC), cascade converters, thermionics, and liquid metal heat pipes.		
-	(U) Continue former Ballistic Missile Defense Organization space vehicle thermal management technology development such as cryogenic coolers. (\$600K)		
-	(U) Start development of cryogenic integration technologies.		
(U) FY 1996:			
-	(U) Continue development of space conventional power technologies such as advanced solar cells and arrays. (\$2,800K)		
-	(U) Complete and transition multi-junction higher efficiency solar cells to the Manufacturing Technology office.		
-	(U) Complete development of Thin-Film Roll-out Array for improved stowage and deployment.		
-	(U) Flight test 'Channel Astro' edge concentrating array (150 watts/kilogram) on a small satellite.		
-	(U) Continue development of space vehicle conventional power technologies such as compact volume/weight batteries. (\$1,400K)		
-	(U) Perform life testing of nickel hydrogen (NiH ₂) batteries.		
-	(U) Flight test sodium sulfur (NaS) batteries.		
-	(U) Continue development of non-nuclear technologies associated with space nuclear power systems such as thermionics technology. (\$300K)		
-	(U) Initiate more efficient AMTEC cells (25%) development.		
-	(U) Continue space vehicle thermal management technology development such as cryogenic coolers. (\$1,000K)		
-	(U) Initiate single stage reverse Brayton cryocooler development.		
(U) FY 1997:			
-	(U) Continue development of space conventional power technologies such as advanced solar cells and arrays. (\$2,800K)		
-	(U) Flight test Thin Film Roll-Out Array.		
-	(U) Develop 30% efficient energy conversion devices.		
-	(U) Continue development of space vehicle conventional power technologies such as compact volume/weight batteries. (\$1,400K)		
-	(U) Continue NiH ₂ low earth orbit life testing.		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

February 1995

PE NUMBER AND TITLE

0603401F Advanced Spacecraft Technology

682J

- (U) Develop 200 watt hour/kilogram (Whr/kg) solid state lithium battery for satellite applications.
- (U) Continue development of non-nuclear technologies associated with space nuclear power systems such as thermionics technology. (\$300K)
- (U) Develop 25% alkali metal thermal to electric conversion cells.
- (U) Design and fabricate thermionic bed power system components for evaluation.
- (U) Continue space vehicle thermal management technology development such as cryogenic coolers. (\$1,000K)
- (U) Qualify single stage reverse Brayton cryocooler for space applications.

	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>	
	4,430	4,500	4,700	5,500	Cont
	4,244	4,400	5,500	5,500	Cont
Total					Cost

(U) Current President's Budget

Funding: Changes reflect increased Air Force priority on space-related Science and Technology.

Technical: Not Applicable.

(U) Related Activities:

- (U) PE 0602203F, Aerospace Propulsion.
- (U) PE 0602601F, Phillips Laboratory.
- (U) PE 0603302F, Space and Missile Propulsion Technology.
- (U) PE 0603218C, Research and Support.
- (U) PE 0603226E, Experimental Evaluation of Major Innovative Technologies.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

6 - Management Support

0603402F Space Test Program

PROJECT

2617

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
2617 Space Research Flight Support*	41,473	65,477	57,710	36,120	38,210	40,599	40,892	42,772	Continuing	Continuing

* FY95 submission referred to project 2617 as "Free-Flyer Spacecraft Missions." Projects 2620 and 4233 have been deleted and 2617 renamed in this submission. FY94 and FY95 funding reflect sums of all three projects.

(U) A. Mission Description and Budget Item Justification

(U) Space Test Program (STP) is a Budget Activity/Research Category RDT&E Management Support program. It provides support to the DoD space research community by providing unique spaceflight testing opportunities for experiments whose scope ranges from basic research to advanced development. The experiments STP supports demonstrate new space system technologies, concepts and designs or determine space environmental effects on DoD space systems and search out methods for mitigating them. This DoD program provides the only substantial spaceflight capability to perform fly-before-buy demonstrations of advanced technologies in a space environment.

(U) The space research experiments STP accommodates are justified, developed and provided by various Service laboratories and DoD agencies whose goal is to improve DoD's current and future operational space system's performance. Experiments are considered for spaceflight based on the priority they are assigned by a DoD Space Experiment Review Board independent of the STP Program Office, which is comprised of representatives from the Air Force, Army, Navy, BMDO, and ARPA who have expertise in DoD operational space requirements. STP is given the resulting prioritized list of experiments and seeks out the least expensive means of spaceflight available to fly as many of the experiments it can within the constraints of priority, opportunity and available funding. Spaceflight opportunities utilized include piggybacking on military or commercial satellites, both foreign and domestic, and the Space Shuttle. For those experiments whose requirements cannot be satisfied with secondary opportunities, dedicated STP spacecraft and launch vehicle hardware are procured as required. This includes Small and Medium Launch Vehicle class satellites as determined by experiment requirements and available funding, as well as Small Launch Vehicle class boosters themselves. Medium Launch Vehicle class boosters are provided as required by PE 35119F. If a particular manifested experiment fails to materialize, or is deemed impractical to fly given current funding or the appropriate spaceflight opportunity becomes unavailable, STP shifts what resources remain to provide spaceflight support for the next highest priority experiments.

(U) The Air Force requires a stable pool of funds for this level of effort program which can be applied with flexibility to take advantage of whatever means of spaceflight is deemed most cost effective for a given experiment or complement of experiments. This flexibility is essential to take advantage of inexpensive "target of opportunity" space hardware, including operational spacecraft where margin is usually firmly identified during the later stages of spacecraft development. This assures the greatest amount of DoD space research accomplished with the limited funds available. Without the requested funding, DoD will lose its most successful and cost effective capability to launch and test new technologies prior to their initial incorporation into very expensive and demanding operational space systems. Furthermore, the individual Services and DoD agencies will be forced to duplicate this low cost, risk mitigating capability. This will result in the loss of the

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

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BUDGET ACTIVITY

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6 - Management Support

0603402F Space Test Program

PROJECT

2617

contractual economy of scale a single space test organization provides as well as the filtering function of the STP Space Experiment Review Board to assure minimum duplication of the space research experiments themselves.

(U) FY 1994

- (U) Worked spaceflight opportunities for as many of the highest ranked experiments from the 1993 Space Experiment Review Board (SERB) list as possible consistent with the availability of practical spaceflight means and funding. Continue to develop the spaceflight missions for those experiments currently manifested and manage the launch effort for those ready for flight as appropriate. (\$41,473)

(U) FY 1995

- (U) Work spaceflight opportunities for as many of the highest ranked experiments from the 1994 SERB list as possible consistent with the availability of practical spaceflight means and funding. Continue to develop the spaceflight missions for those experiments currently manifested and manage the launch effort for those ready for flight as appropriate. (\$52,477)

- (U) Congressionally directed Miniature Sensor Technology Integration (MSTI) program unrelated to Space Test Program (\$13,000)

(U) FY 1996

- (U) Work spaceflight opportunities for as many of the highest ranked experiments from the 1995 SERB list as possible consistent with the availability of practical spaceflight means and funding. Continue to develop the spaceflight missions for those experiments currently manifested and manage the launch effort for those ready for flight as appropriate. (\$57,710)

(U) FY 1997

- (U) Work spaceflight opportunities for as many of the highest ranked experiments from the 1996 SERB list as possible consistent with the availability of practical spaceflight means and funding. Continue to develop the spaceflight missions for those experiments currently manifested and manage the launch effort for those ready for flight as appropriate. (\$36,120)

(U) B. Program Change Summary (\$ in Thousands)

	FY 1994	FY 1995	FY 1996	FY 1997	Total Cost
(U) Previous President's Budget	43,274	62,084	68,533	64,746	Continuing
(U) Appropriated Value	43,918	67,998			
(U) Adjustments to Appropriated Value					
a. Cong Gen Reductions	- 644	- 1,365			
b. SBIR	- 601	- 1,139			
c. Omnibus or Other Above Threshold Reprogram	- 1,200				

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February, 1995		PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE			
6 - Management Support		0603402F Space Test Program			
		FY 1994	FY 1995	FY 1996	FY 1997
			- 17		
		41,473	65,477	- 10,823	- 28,626
				57,710	36,120
					Continuing
		Total			
		Cost			
d. Below Threshold Reprogramming					
(U) Adjustments to Budget Years Since FY95 PB					
(U) Current Budget Submit/President's Budget					
(U) Change Summary Explanation:					
Funding: FY97 and the following outyears reflect a move to reimbursability from non-Air Force users and not a significant reduction in overall actual level of effort. The \$10,823,000 reduction in FY96 represents an intermediate transition to reimbursability.					
Schedule: Mission delay induced cost growth.					
Technical: Not Applicable.					
(U) C. Other Program Funding Summary (\$ in Thousands):					
Not Applicable.					
Related RDT&E:					
(U) PE #305119F, (Medium Launch Vehicles).					
(U) D. Schedule Profile (Current projection. Experiments are added as new spaceflight opportunities and budget permits)					
		FY 1994	FY 1995	FY 1996	FY 1997
		1 2 3 4 1 2 3 4 1 2 3 4			
(U) AMOS (STS-61)		X			
(U) CONCORP-1, APE-B (STS-60)			X		
(U) BETSU, AMOS, APE-B (STS-62)			X		
(U) ACRE (S93-2)			X		
(U) TAOS (P90-5)			X		
(U) STL (NASA), VFT-4 (STS-59)				X	
(U) SIDEEX (P91-2)				X	
(U) DUCTED, ADS, CHAMPION, PEA (P90-1)				X	
(U) MAST, AMOS (STS-65)					X

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

6 - Management Support

0603402F Space Test Program

2617

	FY 1994					FY 1995					FY 1996					FY 1997			
	1	2	3			4	1	2			3	4	1			2	3	4	1
(U) PASP Plus, CRUX, FERRO (P90-6/APEX)				X															
(U) MAST, AMOS, RME III, LITE-1 (STS-64)				X															
(U) CREAM, MAST (STS-68)				X															
(U) SWIM (S91-4)						X													
(U) MAHRSI (STS66/CRIS-SPAS: S90-4)						X													
(U) ACTEX II, EDMM, SQUOD, SAMMES, SAWAFE (P92-2)																			
(U) FUVIS, AMOS, MSX, WINDEX, CREAMS(2), RME III, STL (STS-63)							X												
(U) MSX (STS-67)							X												
(U) HERCULES, STL-B, MSX, AMOS, VFT-4, RME III, WINDEX, MIS-B (STS-70)								X											
(U) CHARGECON-GEO (S90-3)											X								
(U) REX II (P94-2)											X								
(U) STL (NASA)/NIHL (STS-69)											X								
(U) BINRAD (RUSSIAN RESURS)											X								
(U) IRIM (STS-72)											X								
(U) LMTE (LiTE) (STS-XX/S93-5)																TBD			
(U) TRIS II (STS-XX/S85-2)																TBD			
(U) FLEX BEAM (STS-XX/P93-6)																TBD			
(U) FORTE (P94-1)																	X		
(U) ESEX, USA, GIMI, SPADUS, HIRAAS, HTSSE II, CIV, EUVIP (P91-1/ARGOS)																		X	
(U) POGS-II (S92-1)																			X

*NOTE: NASA does not manifest shuttle flights (STS) beyond 18 months.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE									
3 - Advanced Development		0603410F Space Systems Environmental Interactions Technology Development									
	COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
	Total Program Element (PE) Cost	3,531	4,148	3,479	3,280	4,179	4,279	4,377	4,476	Continuing	Continuing
2821	Space Systems Design and Test Standards	180	0	0	0	0	0	0	0	Continuing	Continuing
2822	Space Environmental Impact Test	2,368	3,158	2,194	1,747	2,764	3,229	3,827	4,076	Continuing	Continuing
2823	Space Hazards Mitigation	983	990	1,285	1,533	11,415	1,050	550	400	Continuing	Continuing

(U) **A. Mission Description and Budget Item Justification:** This Advanced Development program develops and demonstrates cost-effective solutions to mitigate hazardous space environmental interactions that degrade spacecraft operations. The information gained through these programs is directly transferred to operational users in the form of new and revised military standards, handbooks, and computer-aided engineering and assessment tools. Advanced technology products include: (1) an autonomous active charge control system to prevent charge buildup on high-altitude spacecraft; (2) a compact environmental anomaly sensor to provide warning to satellites of space-environmental conditions likely to cause anomalous operations; and (3) improved specifications for advanced solar array technologies from the Photovoltaic Array Space Power Plus Diagnostics experiment. Additional space experiments are the Charging Hazards and Wake Studies experiment to determine space environmental hazards to exposed high voltages, the Shuttle Potential and Return Electrons Experiment to investigate the effect of high current electron beams on the ambient space environment, and the Space Waves in Plasmas Experiment to look at space effects on high-frequency radio transmissions. This program's objective is to improve Air Force space system survivability and reliability and expedite the transfer of new technology into planned military capabilities. All efforts in this program element contain the resources necessary, including civilian salaries, to manage, conduct, and document the technical activities.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)				DATE
BUDGET ACTIVITY		PE NUMBER AND TITLE		
3 - Advanced Development		0603410F Space Systems Environmental Interactions Technology Development		
(U) B. <u>Program Change Summary (\$ in Thousands):</u>		FY 1994	FY 1995	FY 1996
(U) Previous President's Budget		3,620	4,200	FY 1997
(U) Appropriated Value		3,640	4,200	4,355
(U) Adjustments to Appropriated Value				
a. Congressional General Reductions		-20	-52	
b. SBIR		-42		
c. Below Threshold Reprogrammings		-47		
(U) Current President's Budget		3,531	4,148	3,280
(U) Change Summary Explanation:				Cont
Funding: Not Applicable.				
Schedule: Not Applicable.				
Technical: Not Applicable.				
(U) C. <u>Other Program Funding Summary:</u> Not Applicable.				
(U) D. <u>Schedule Profile:</u> Not Applicable.				

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	PROJECT																			
BUDGET ACTIVITY										PE NUMBER AND TITLE																				
3 - Advanced Development										0603410F Space Systems Environmental Interactions Technology Development																				
COST (In Thousands)										FY 2001 Estimate	Cost to Complete	Total Cost																		
2821	Space Systems Design and Test Standards	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate		0	0	Continuing																		
<p>(U) <u>A. Mission Description and Budget Item Justification:</u> This project integrates the results of experiments conducted under Project 2822 into useful analysis tools for space system operators and designers. Project output improve design guidelines and test standards, help develop new radiation models and microelectronic test procedures, and enhance computer algorithm codes/models. Results are used by the Air Force Space and Missile Systems Center (SMC).</p> <p>(U) <u>FY 1994:</u></p> <ul style="list-style-type: none"> - (U) Completed Spacecraft Charging Model MIL-Standard documentation and final report. (\$65K) - (U) Analyzed the Combined Release and Radiation Effects Satellite low-energy electron data. (\$50K) - (U) Transferred Single Event Upset model to SMC. (\$65K) <p>(U) <u>FY 1995:</u> Not Applicable.</p> <p>(U) <u>FY 1996:</u> Not Applicable.</p> <p>(U) <u>FY 1997:</u> Not Applicable.</p> <p>(U) <u>B. Program Change Summary (\$ in Thousands):</u></p> <table border="0"> <tr> <td></td> <td>FY 1994</td> <td>FY 1995</td> <td>FY 1996</td> <td>FY 1997</td> <td>Total</td> </tr> <tr> <td>(U) Previous President's Budget</td> <td>180</td> <td>0</td> <td>0</td> <td>0</td> <td>Cost</td> </tr> <tr> <td>(U) Current President's Budget</td> <td>180</td> <td>0</td> <td>0</td> <td>0</td> <td>Cont</td> </tr> </table>														FY 1994	FY 1995	FY 1996	FY 1997	Total	(U) Previous President's Budget	180	0	0	0	Cost	(U) Current President's Budget	180	0	0	0	Cont
	FY 1994	FY 1995	FY 1996	FY 1997	Total																									
(U) Previous President's Budget	180	0	0	0	Cost																									
(U) Current President's Budget	180	0	0	0	Cont																									

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - Advanced Development	0603410F Space Systems Environmental Interactions Technology Development	2821
<p>(U) Change Summary Explanation: Funding: Effort incorporated into Projects 2822 and 2823 in FY 1995.</p> <p>Schedule: Not Applicable.</p> <p>Technical: Not Applicable.</p> <p>(U) C. <u>Other Program Funding Summary:</u></p> <p>(U) <u>Related Activities:</u></p> <ul style="list-style-type: none"> - (U) PE 0602101F, Geophysics. - (U) NASA/Air Force Space technology Interdependency Group coordinates efforts and reviews programs annually. - (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication. <p>(U) D. <u>Schedule Profile:</u> Not Applicable.</p>		

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
3 - Advanced Development		0603410F Space Systems Environmental Interactions Technology Development								2822	
COST (in Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
2822	Space Environmental Impact Test	2,368	3,158	2,194	1,747	2,764	3,229	3,827	4,076	Continuing	Continuing
<p>(U) <u>A. Mission Description and Budget Item Justification:</u> To counter adverse spacecraft-environment interactions, experiments must be conducted to understand how new technologies are affected. Much remains unknown on the exact interaction mechanisms that cause plasma-induced current leakage and arcing at higher operating voltages, radiation damage to solar arrays and electronic sensors, and deep-dielectric charging arcs that cause spurious signals and upsets in microelectronics. This project will provide: (1) significant improvements in the Science and Technology base by developing space instrumentation to measure hazards posed by the natural environment; (2) increased performance and longer lifetimes for space systems; and (3) an earlier capability to withstand the effects of the space environment.</p> <p>(U) <u>FY 1994:</u></p> <ul style="list-style-type: none"> - (U) Developed and tested miniaturized space plasma sensors; characterized plasma in and around spacecraft wakes to improve low-earth environmental specifications to provide critical validation of charge analysis modeling codes necessary for spacecraft designers. (\$680K) - (U) Launched space hazard sensors (Mission 1) as part the Wake Shield Facility on Space Transportation System-60; published preliminary report. - (U) Demonstrated next-generation solar array technologies to provide the requisite pedigree of proven performance in space before being integrated into future power systems; characterized array interactions with natural space environment. (\$710K) - (U) Launched Photovoltaic Array Space Power Plus Diagnostics on the APEX-satellite mission and began analysis of the flight data. - (U) Determined vehicle charging and environmental interactions which will result in new preventive measures to protect spacecraft from charging hazards, enhanced analytical models of vehicle charging, and spacecraft environmental interactions directly applicable to future high-powered space systems. (\$735K) - (U) Fabricated the Signature Identification and Contamination Interaction Measurements (SICIM) Infrared Imager (IRIM) flight unit; continued IRIM mission planning. - (U) Continued Shuttle Potential and Return Electrons Experiment data analysis, published final report, and validated large-structure charging algorithm. - (U) Determined space environment interactions that limit performance of long-range, high frequency communications and radar systems, resulting in design and performance standards to counter scintillation effects and decrease radio systems susceptibility to plasma-induced environmental interactions. (\$243K) - (U) Fabricated and delivered the instruments for flight aboard the Canadian Space Agency sounding rocket to study high-frequency radio propagation in space plasmas. <p>(U) <u>FY 1995:</u></p> <ul style="list-style-type: none"> - (U) Develop and test miniaturized space plasma sensors; characterize plasma in and around spacecraft wakes to improve low-earth environmental specifications to provide critical validation of charge analysis modeling codes necessary for spacecraft designers. (\$990K) 											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1995
BUDGET ACTIVITY 3 - Advanced Development	PE NUMBER AND TITLE 0603410F Space Systems Environmental Interactions Technology Development	PROJECT 2822

- (U) Continue analysis on plasma data collected from the space hazard sensors Mission 1 and publish reports to validate charge analysis modeling codes.
- (U) Upgrade space hazard sensors hardware from Mission 1 and launch Mission 2 to demonstrate improved performance from Mission 1.
- (U) Begin analysis of plasma data collected during Mission 2 to verify performance of space plasma sensors and to further validate analysis modeling codes.
- (U) Based on Mission 1 and 2 performances, provide the Defense Meteorological Satellite Program a miniaturized space plasma sensor design.
- (U) Demonstrate next-generation solar array technologies to provide the requisite pedigree of proven performance in space before being integrated into future power systems; characterize array interactions with natural space environment. (\$875K)
 - (U) Support on-orbit operations of advanced solar arrays to conduct the experiments and collect data required to prove the space performance.
 - (U) Analyze data and produce preliminary reports on high-voltage plasma interactions and on advanced solar array radiation degradation for use in updating space power design guidelines and test standards.
- (U) Determine vehicle charging and environmental interactions which will result in new preventive measures to protect spacecraft from charging hazards, enhanced analytical models of vehicle charging, and spacecraft environmental interactions directly applicable to future high-powered space systems. (\$500K)
 - (U) Incorporate charging algorithm from Shuttle Potential and Return Electrons Experiment into modeling codes.
 - (U) Prepare hardware for reflight to obtain data on vehicle charging effects and environmental interactions of the very high-power generation created by a long tether in space and the associated high energy electron beam discharges.
- (U) Determine space environment interactions that limit performance of long-range, high frequency communications and radar systems, resulting in design and performance standards to counter scintillation effects and decrease radio systems susceptibility to plasma-induced environmental interactions. (\$293K)
 - (U) Deliver and integrate hardware on a sounding rocket for data collection of space environment interactions with high frequency transmissions.
- (U) Develop and test a suite of miniaturized, low-power, scientific quality instruments to measure the populations of natural space particles responsible for radiation dose effects and hazardous charge buildups. (\$500K)
 - (U) Begin conceptual design of a miniaturized low-power electron telescope to provide charge buildup information during space tests of new space technologies.
 - (U) Begin conceptual design of a miniaturized low-power proton telescope to provide low energy dose information during space tests of new space technologies.
 - (U) Begin conceptual design of a miniaturized low-power dosimeter to provide high energy dose and single event upset information during space tests of new space technologies.

(U) FY 1996:

- (U) Develop and test miniaturized space plasma sensors; characterize plasma in and around spacecraft wakes to improve low-earth environmental specifications to provide critical validation of charge analysis modeling codes necessary for spacecraft designers. (\$280K)
 - (U) Develop the Digital Ion Driftmeter (space plasma sensor designed for use on the Defense Meteorological Satellite) for space test to obtain the space qualification needed for operational use.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1995
BUDGET ACTIVITY 3 - Advanced Development	PE NUMBER AND TITLE 0603410F Space Systems Environmental Interactions Technology Development	PROJECT 2822

- (U) Demonstrate next-generation solar array technologies to provide the requisite pedigree of proven performance in space before being integrated into future power systems; characterize array interactions with natural space environment. (\$590K)
 - (U) Support on-orbit operations of advanced solar arrays to conduct the experiments and collect data required to prove the space performance.
 - (U) Analyze data and produce detailed reports on high-voltage plasma interactions and on advanced solar array radiation degradation for use in updating space power design guidelines and test standards.
- (U) Determine vehicle charging and environmental interactions which will result in new preventive measures to protect spacecraft from charging hazards, enhanced analytical models of vehicle charging, and spacecraft environmental interactions directly applicable to future high-powered space systems. (\$234K)
 - (U) Complete integration and support launch and space operations to obtain data vehicle charging effects.
 - (U) Begin data analysis leading to improvements in modeling codes for vehicle charging effects and environmental interactions.
- (U) Determine space environment interactions that limit performance of long-range, high frequency communications and radar systems, resulting in design and performance standards to counter scintillation effects and decrease radio systems susceptibility to plasma-induced environmental interactions. (\$490K)
 - (U) Support the sounding rocket launch and data collection.
 - (U) Conduct preliminary analysis data for eventual incorporation into design and performance standards to counter scintillation effects and decrease susceptibility to plasma interactions.
- (U) Develop and test a suite of miniaturized, low-power, scientific quality instruments to measure the populations of natural space particles responsible for radiation dose effects and hazardous charge buildups. (\$600K; additional funding is provided through Project 2823)
 - (U) Complete design and begin fabrication of a miniaturized, low-power electron telescope to provide charge buildup information during space tests of new space technologies.
 - (U) Complete design and begin fabrication of a miniaturized, low-power dosimeter to provide high energy dose and single event upset information during space tests of new space technologies.

(U) FY 1997:

- (U) Develop and test miniaturized space plasma sensors; characterize plasma in and around spacecraft wakes to improve low-earth environmental specifications to provide critical validation of charge analysis modeling codes necessary for spacecraft designers. (\$400K)
 - (U) Deliver and integrate the Digital Ion Driftmeter and support launch operations to obtain the space qualification needed for operational use.
- (U) Demonstrate next-generation solar array technologies to provide the requisite pedigree of proven performance in space before being integrated into future power systems; characterize array interactions with natural space environment. (\$410K)
 - (U) Complete analysis and publish final technical reports on high-voltage plasma interactions and on advanced solar array radiation degradation for use in updating space power design guidelines and test standards.
 - (U) Begin conceptual design of future solar array technologies to prove their space performance before being integrated into future space power systems.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1995																																										
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT																																											
3 - Advanced Development	0603410F Space Systems Environmental Interactions Technology Development	2822																																											
<ul style="list-style-type: none"> (U) Determine vehicle charging and environmental interactions which will result in new preventive measures to protect spacecraft from charging hazards, enhanced analytical models of vehicle charging, and spacecraft environmental interactions directly applicable to future high-powered space systems. (\$110K) <ul style="list-style-type: none"> (U) Continue data analysis and publish report to improve modeling codes for vehicle charging effects and environmental interactions. (U) Determine space environment interactions that limit performance of long-range, high frequency communications and radar systems. (\$410K) <ul style="list-style-type: none"> (U) Continue analysis of sounding rocket data for eventual incorporation into design and performance standards to counter scintillation effects and decrease susceptibility to plasma interactions. (U) Develop and test a suite of miniaturized, low-power, scientific quality instruments to measure the populations of natural space particles responsible for radiation dose effects and hazardous charge buildups. (\$197K; additional funding is provided through Project 2823) <ul style="list-style-type: none"> (U) Complete fabrication of a miniaturized dosimeter to provide high energy dose and single event upset information during space tests of new space technologies. (U) Develop and test an engineering test module to provide improved monitoring, specification, and prediction of hazardous deep dielectric charging effects on new and emerging technologies, allowing more rapid transfer into operational. (\$220K) <ul style="list-style-type: none"> (U) Conduct concept design of an engineering test module to eliminate the uncertainties of how deep dielectric charging effects new and emerging technologies. 																																													
<p>(U) B. Program Change Summary (\$ in Thousands):</p> <table border="1"> <thead> <tr> <th></th> <th>FY 1994</th> <th>FY 1995</th> <th>FY 1996</th> <th>FY 1997</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>(U) Previous President's Budget</td> <td>2,315</td> <td>3,250</td> <td>2,493</td> <td>2,702</td> <td>Cost</td> </tr> <tr> <td>(U) Current President's Budget</td> <td>2,368</td> <td>3,158</td> <td>2,194</td> <td>1,747</td> <td>Cont</td> </tr> <tr> <td>(U) Change Summary Explanation:</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Funding: Not Applicable.</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Schedule: Not Applicable.</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Technical: Not Applicable.</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>					FY 1994	FY 1995	FY 1996	FY 1997	Total	(U) Previous President's Budget	2,315	3,250	2,493	2,702	Cost	(U) Current President's Budget	2,368	3,158	2,194	1,747	Cont	(U) Change Summary Explanation:						Funding: Not Applicable.						Schedule: Not Applicable.						Technical: Not Applicable.					
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Technical: Not Applicable.																																													

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - Advanced Development	0603410F Space Systems Environmental Interactions Technology Development	2822
<p>(U) C. <u>Other Program Funding Summary:</u></p> <p>(U) Related Activities:</p> <ul style="list-style-type: none"> - (U) PE 0602101F, Geophysics. - (U) PE 0603401F, Advanced Spacecraft Technology. - (U) PE 0603402F, Space Test Program. - (U) PE 0603428F, Satellite Systems Survivability. - (U) NASA/Air Force Space technology Interdependency Group coordinates efforts and reviews programs annually. - (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication. <p>(U) D. <u>Schedule Profile:</u> Not Applicable.</p>		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE
February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

3 - Advanced Development

0603410F Space Systems Environmental
Interactions Technology Development

2823

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
2823 Space Hazards Mitigation	983	990	1,285	1,533	1,415	1,050	550	400	Continuing	Continuing

(U) **A. Mission Description and Budget Item Justification:** The Air Force needs the capability to prevent electrical charge buildup and the resulting disabling discharges on operational satellites. For high-altitude and geosynchronous spacecraft, a Charge Control System has been developed; it has been integrated on a Defense Satellite Communications System satellite to validate the concept of autonomous active charge control and to baseline a basic engineering design. For low/medium orbit satellites, a Compact Environmental Anomaly Sensor is being developed to provide warnings on space conditions likely to produce anomalous operational behavior.

(U) FY 1994:

- (U) Developed and demonstrated an autonomous active charge control system to prevent hazardous charge buildup on high-altitude and geosynchronous orbit satellites, decreasing circuitry upsets and component damage, improving on-orbit reliability, and enhancing system performance. (\$221K)
- (U) Integrated the advanced charge control system onto the Defense Satellite Communications System B-7 satellite; programmed the flight software for the charging algorithm.
- (U) Developed and tested an autonomous, compact, lightweight, low-power instrument to monitor the space environment near a satellite and warn of hazardous conditions. (\$762K)
 - (U) Completed detailed component design of the compact, lightweight, low-power instrument.
 - (U) Began fabrication of the compact, lightweight, low-power instrument system flight unit.

(U) FY 1995:

- (U) Develop and demonstrate an autonomous active charge control system to prevent hazardous charge buildup on high-altitude and geosynchronous orbit satellites, decreasing circuitry upsets and component damage, improving on-orbit reliability, and enhancing system performance. (\$250K)
 - (U) Support testing of an advanced charge control system on the Defense Satellite Communications System B-7 satellite as a housekeeping device; plan on-orbit operations.
- (U) Develop and test an autonomous, compact, lightweight, low-power instrument to monitor the space environment near a satellite and warn of hazardous conditions. (\$740K)
 - (U) Complete fabrication, calibration, and testing of autonomous, compact, lightweight, low-power instrument flight unit hardware to prove its space performance before being integrated into future space systems as a housekeeping device.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
3 - Advanced Development	0603410F Space Systems Environmental Interactions Technology Development	2823	

(U) <u>FY 1996:</u>	
- (U) Develop and demonstrate an autonomous active charge control system to prevent hazardous charge buildup on high-altitude and geosynchronous orbit satellites, decreasing circuitry upsets and component damage, improving on-orbit reliability, and enhancing system performance. (\$250K)	
- (U) Launch the advanced charge control system on Defense Satellite Communications System satellite; support initial on-orbit operations and begin evaluating performance.	
- (U) Develop and test an autonomous, compact, lightweight, low-power instrument to monitor the space environment near a satellite and warn of hazardous conditions. (\$500K)	
- (U) Support integration and testing with the Space Test Program and Milstar launch vehicles as a housekeeping device.	
- (U) Develop and test a suite of miniaturized, low-power, scientific quality instruments to measure the populations of natural space particles responsible for radiation dose effects and hazardous charge buildups. (\$535K; additional funding is provided through Project 2822)	
- (U) Complete design and begin fabrication of a miniaturized low-power proton telescope to provide low energy dose information during space tests of new space technologies.	
(U) <u>FY 1997:</u>	
- (U) Develop and demonstrate an autonomous active charge control system to prevent hazardous charge buildup on high-altitude and geosynchronous orbit satellites, decreasing circuitry upsets and component damage, improving on-orbit reliability, and enhancing system performance. (\$150K)	
- (U) Continue evaluation of the data from the Defense Satellite Communications System flight; produce preliminary report.	
- (U) Develop and test an autonomous, compact, lightweight, low-power instrument to monitor the space environment near a satellite and warn of hazardous conditions. (\$600K)	
- (U) Support launch and provide on-orbit support for the Space Test Program and Milstar launch vehicles; begin evaluating capability.	
- (U) Develop and test a suite of miniaturized, low-power, scientific quality instruments to measure the populations of natural space particles responsible for radiation dose effects and hazardous charge buildups. (\$783K; additional funding is provided through Project 2822)	
- (U) Complete fabrication of a miniaturized low-power electron telescope to provide charge buildup information during space tests of new space technologies.	
- (U) Complete fabrication of a miniaturized low-power proton telescope to provide low energy dose information during space tests of new space technologies.	

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

3 - Advanced Development

0603410F Space Systems Environmental
Interactions Technology Development

2823

(U) B. Program Change Summary (\$ in Thousands):

	FY 1994	FY 1995	FY 1996	FY 1997	Total
(U) Previous President's Budget	1,125	950	1,685	1,653	Cost
(U) Current President's Budget	983	990	1,285	1,533	Cont
					Cont

(U) Change Summary Explanation:
Funding: Not Applicable.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. Other Program Funding Summary:(U) Related Activities:

- (U) PE 0602101F, Geophysics.
- (U) PE 0603402F, Space Test Program.
- (U) NASA/Air Force Space technology Interdependency Group coordinates efforts and reviews programs annually.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

(U) D. Schedule Profile: Not Applicable.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
4 - Demonstration Validation		0603430F - Advanced MILSATCOM								4050	
COST (\$ in Thousands)		FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
4050 Advanced MILSATCOM		0	21,674	30,038	34,816	44,733	114,405	236,809	609,971	7,099,000	8,191,823
<p>(U) A. Mission Description and Budget Item Justification</p> <p>Develop and acquire an advanced Military Satellite Communications (MILSATCOM) satellite and satellite mission control interface, and develop terminal technology for survivable, jam-resistant, world-wide, secure, high capacity communications for the strategic and tactical warfighter. This system provides the basis for the next generation military communications satellite system. Advanced MILSATCOM satellites will replenish existing Extremely High Frequency/Ultra High Frequency (EHF/UHF) (Milstar II) and Super High Frequency (SHF) (DSCS III) systems. It will incorporate standardized spacecraft components and modular EHF and SHF payloads, each to be launched separately on a Medium Launch Vehicle (MLV). The Advanced EHF or EHF/UHF payload will be available for first launch in 2006. The Advanced SHF payload will be available for first launch in 2007. This consolidated replenishment will make maximum use of commercial bus developments and reduce orbital support and launch integration costs. The activities funded under this program element implement the Secretary of Defense's 1993 MILSATCOM Bottom Up Review decision to field a lower cost, advanced MILSATCOM satellite. This program is in Budget Activity Research Category Demonstration and Validation based on direction from the FY95 Defense Planning Guidance. Acquisition streamlining approaches are being considered for implementation on the advanced MILSATCOM program. A SATCOM master plan will be provided to Congress in FY 95 which will address an integrated advanced MILSATCOM approach.</p> <p>(U) <u>FY 1994</u> - (U) None.</p> <p>(U) <u>FY 1995</u> - (U) MILSATCOM Technology Validation Program - (U) Start Industry contracted projects in support of advanced technology studies and development. (\$17,074) - (U) Start Laboratory study and analysis support for technology program. (\$4,200) - (U) Start basic Program Office support activities for advanced technology program. (\$400)</p>											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	PROJECT NO.
BUDGET ACTIVITY		PE NUMBER AND TITLE	
4 - Demonstration Validation		0603430F - Advanced MILSATCOM	4050
(U) FY 1996			
- (U) MILSATCOM Technology Validation Program			
- (U) Continue validation of advanced EHF technologies. (\$23,500)			
- (U) Continue basic Program Office support activities for advanced technology program. (\$1,500)			
- (U) Advanced MILSATCOM System Studies (\$5,038)			
- (U) Develop architecture and requirements documentation for the Advanced MILSATCOM system.			
(U) FY 1997			
- (U) MILSATCOM Technology Validation Program			
- (U) Continue validation of advanced EHF technologies. (\$13,316)			
- (U) Continue basic Program Office support activities for advanced technology program. (\$1,500)			
- (U) Start Processing Subsystem Engineering Model Program. (\$20,000)			
(U) B. Program Change Summary (\$ in Thousands)			
(U) Previous President's Budget	1994	1995	1996
(U) Appropriated Value	0	22,095	21,421
(U) Adjustments to Appropriated Value		22,095	28,766
a. Cong Gen Reduction		-44	
b. SBIR		-377	
c. Omnibus and Other Above Threshold Reprogram			
d. Below Threshold Reprogramming			
(U) Adjustments to Budget Years Since FY95 PB			+8,617
(U) Current Budget Submit/President's Budget	0	21,674	30,038
			+6,050
			34,816
(U) Change Summary Explanation:			
Funding: Funding changes in FY96 and FY97 reflect increased scope in the program due to the addition of an EHF digital processing engineering model demonstration to reduce risk to the advanced EHF program.			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995	
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.		
4 - Demonstration Validation	0603430F - Advanced MILSATCOM	4050		
Schedule: Not Applicable.				
Technical: Not Applicable.				
(U) C. <u>Other Program Funding Summary (\$ in Thousands)</u>				
Related RDT&E:				
(U) PE #604479F, Milstar LDR/MDR Satellite Communications				
(U) PE #604577N, EHF Satellite Communications				
(U) PE #303142A, Tactical Communications Ground Environment				
(U) PE #303110F, Defense Satellite Communications System				
(U) PE #603790D, International Military Satellite (INMILSAT)				
(U) D. <u>Schedule Profile:</u>				
(U) Technology Project Awards				
(U) Technology Project Awards/Renewals				
(U) Start Processing Subsystem Engineering Model				
(U) Program Review				
(U) Milestone II - Mid FY00				
(U) EHF program EMD Start - Mid FY00				
(U) SHF program EMD Start - Mid FY01				
(U) EHF - First Delivery - Mid FY06				
(U) SHF - First Delivery - Mid-FY07				

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE		PROJECT NO.													
BUDGET ACTIVITY										PE NUMBER AND TITLE		PROJECT NO.													
4 - Demonstration Validation										0603430F - Advanced MILSATCOM		4050													
(U) A. Project Cost Breakdown (\$ in Thousands)										1994		1995		1996		1997									
(U) MILSATCOM Technology Validation Program										0		21,674		25,000		14,816									
(U) Processing Subsystem Engineering Model										0		0		0		20,000									
(U) Advanced MILSATCOM System Studies										0		0		5,038		0									
(U) Total										0		21,674		30,038		34,816									
(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)																									
Performing Organizations:																									
Contractor or Government Performing Activity		Contract Method/Type or Funding Vehicle		Award or Obligation Date		Performing Activity EAC		Project Office EAC		Total Prior to 1994		Budget 1994		Budget 1995		Budget 1996		Budget 1997		Budget to Complete		Total Program			
Product Development Organizations (System Development)																									
MIT/LL*		MIPR		Feb 95		8,300		8,300		0		0		1,900		2,400		2,000		2,000		8,300			
Hughes*		CPFF		Jan 95		5,000		5,000		0		0		1,886		614		2,500		0		5,000			
TRW*		CPFF		Jan 95		4,923		4,923		0		0		1,511		1,900		1,512		0		4,923			
TRW*		CPFF		Feb 95		1,487		1,487		0		0		1,487		0		0		0		1,487			
HSC/Loral*		CPFF		Jan 95		4,777		4,777		0		0		1,398		1,798		1,581		0		4,777			
Boeing*		CPFF		Jan 95		3,750		3,750		0		0		1,307		1,568		875		0		3,750			
TRW*		CPFF		Feb 95		1,633		1,633		0		0		1,090		543		0		0		1,633			
Texas Instruments*		CPFF		Jan 95		3,172		3,172		0		0		1,042		1,390		740		0		3,172			
MIT/LL*		MIPR		Feb 95		3,800		3,800		0		0		1,000		1,400		1,200		200		3,800			
Various Tech Projects*		Various		2 Qtr 95		37,947		37,947		0		0		8,653		11,887		2,908		14,500		38,325			
TBD		TBD		TBD		TBD		TBD		0		0		0		5,038		20,000		7,549,218		7,574,256			

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE		February 1995																	
BUDGET ACTIVITY				PE NUMBER AND TITLE						PROJECT NO.																			
4 - Demonstration Validation				0603430F - Advanced MILSATCOM						4050																			
* Industrial technology projects have been selected through a broad area announcement process. Abstracts have been received, and proposals on high interest abstracts have been reviewed and selected for contract award.																													
(U) B. <u>Budget Acquisition History and Planning Information Continued (\$ in Thousands)</u>																													
Performing Organizations:																													
Contractor or Government Performing Activity		Contract Method/Type or Funding Vehicle		Award or Obligation Date		Performing Activity EAC		Project Office EAC		Total Prior to 1994		Budget 1994		Budget 1995		Budget 1996		Budget 1997		Budget to Complete		Total Program							
<u>Support and Management Organizations</u>																													
Various		Various		2 Qtr 95		N/A		N/A		0		0		400		1,500		1,500		539,000		542,400							
<u>Test and Evaluation Organizations</u>																													
TBD																													
										0		0		21,274		28,538		33,316		7,565,918		7,649,423							
Subtotal Product Development										0		0		400		1,500		1,500		539,000		542,400							
Subtotal Support and Management										0		0		21,674		30,038		34,816		8,104,918		8,191,823							
Total Project										0		0																	

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

4 - Demonstration And Validation

0603434F National Polar-orbiting Operational
Environmental Satellite System (NPOESS)

4056

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
4056 NPOESS	0	7,374	23,861	41,550	55,276	192,724	209,134	186,669	Continuing	TBD

Note: FY94 and Prior Funding in PE #305160F.

(U) A. Mission Description and Budget Item Justification

Vice President Gore's National Performance Review (NPR) and subsequent Presidential Decision Directive/NSTC-2 (May 1994) direct the Departments of Defense (DoD), Commerce (DoC) and the National Aeronautics and Space Administration to establish a converged national weather satellite program. The converged program, called the National Polar-Orbiting Operational Environmental Satellite System (NPOESS), will combine the follow-on to the DoD's DMSP program and the DoC's Polar-Orbiting Operational Environmental Satellite (POES) program. An integrated tri-agency program office was established on 1 Oct 94 to manage the acquisition and operations of the converged satellite. PE #603434F funding reflects the DoD's share of the the converged program funding. NPOESS will provide operational military commanders and civilian leaders timely, quality weather information to effectively employ weapon systems and protect national resources. The converged program will be the nation's single source of global weather data for operational DoD and DoC use. It will provide visible and infrared cloud cover imagery and other meteorological, oceanographic, and solar-geophysical information. At least three satellites will be required in sun synchronous 450nm polar orbit at all times (sun synchronous means the satellites cross the equator at the same local sun time on each of their 14 orbits/day). This PE is Budget Activity Research Category Demonstration and Validation because it currently supports preparation for DoD/DoC convergence Demonstration/Validation efforts.

(U) FY 1994

- (U) Not Applicable.

(U) FY 1995

- (U) Prepare for a converged system requirements summit and Milestone I review. (\$1,000)
- (U) Prepare for and conduct a System Requirements Review (SRR). (\$6,000)
- (U) Prepare for Demonstration/Validation contract award. (\$374)

(U) FY 1996

- (U) Conduct Milestone I review; support Demonstration/Validation contract award. (\$1,000)
- (U) Conduct/evaluate preliminary system development efforts. (\$9,361)
- (U) Conduct sensor/testbed demonstrations. (\$13,500)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT
4056

4 - Demonstration And Validation

0603434F National Polar-orbiting Operational
Environmental Satellite System (NPOESS)

(U) FY 1997

- (U) Continue to support Demonstration/Validation efforts and prepare for an FY98 Milestone II review. (\$2,000)
- (U) Conduct a System Design Review for the converged system. (\$18,300)
- (U) Conduct primary sensor Preliminary Design Reviews. (\$21,250)

(U) B. Program Change Summary (\$ in Thousands)

	FY 1994	FY 1995	FY 1996	FY 1997
(U) Previous President's Budget	0	7,601	24,481	54,758
(U) Appropriated Value		7,601		
(U) Adjustments to Appropriated Value				
a. Cong Gen Reductions		- 97		
b. SBIR		- 128		
c. Omnibus or Other Above Threshold Reprogram		- 2		
d. Below Threshold Reprogramming			- 620	- 13,208
(U) Adjustments to Budget Years Since FY95 PB			23,861	41,550
(U) Current Budget Submit/President's Budget	0	7,374		

(U) Change Summary Explanation:

Funding: In FY96 and FY97, funding was reduced to reflect the DoD's share of the converged budget as agreed upon with the Department of Commerce.

Schedule: No changes.

Technical: No changes.

(U) C. Other Program Funding Summary (\$ in Thousands)

Not Applicable.

Related RDT&E:

- (U) PE #305160F, Defense Meteorological Satellite Program (DMSP)
- (U) PE #305160N, DMSP (Navy and Army provided funds for Service specific studies)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

4 - Demonstration And Validation

0603434F National Polar-orbiting Operational
Environmental Satellite System (NPOESS)

4056

(U) D. Schedule Profile

	FY 1994			FY 1995			FY 1996			FY 1997		
	1	2	3	4	1	2	3	4	1	2	3	4
(U) Integrated Operational Requirements Document (IORD) Approved												
(U) A-Level Specifications Complete												
(U) Systems Requirements Review (SRR) 1												
(U) Milestone 1 Review												
(U) Demonstration/Validation Contract Award												
(U) SRR 2												
(U) Demonstrations Begin/End												
(U) System Design Review (SDR)												
(U) Sensor Preliminary Design Review (PDR)												

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Exhibit R-3

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	PROJECT
BUDGET ACTIVITY	PE NUMBER AND TITLE		
4 - Demonstration And Validation	0603434F National Polar-orbiting Operational Environmental Satellite System (NPOESS)	February, 1995	4056
(U) B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)			
Government Furnished Property: Not Applicable.			
Subtotal Product Development	4,371	17,661	34,050
Subtotal Support and Management	3,003	6,200	7,500
Subtotal Test and Evaluation			
Total Project	7,374	23,861	41,550
			Cont
			Cont
			TBD
			TBD
			TBD

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE
BUDGET ACTIVITY										February, 1995
PE NUMBER AND TITLE										
0603438F Satellite Sys Survivability										
4 - Demonstration And Validation										
COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	4,245	1,906	0	0	0	0	0	0	0	71,382
2611 Technology Insertion Plan & Analysis	448	100	0	0	0	0	0	0	0	5,300
2612 Prototype Demonstrations	2,948	1,466	0	0	0	0	0	0	0	39,282
2613 Component Level Tech Applications	849	340	0	0	0	0	0	0	0	26,800

(U) A. Mission Description and Budget Item Justification
 This program has performed critical survivability planning, modeling, analysis, concept evaluations and technology prototyping to meet current and projected military space system survivability requirements. The program was structured to provide a balanced development of survivability capabilities for the space, ground, and communications segments of space systems. The program developed and demonstrated technologies and prototype hardware and software, as well as operational procedures, strategy, and tactics that will provide survivability capabilities for military space systems to meet both current and future threats. The current major prototyping effort of this program is Technology for Autonomous Operational Survivability (TAOS). TAOS is a one year, on-orbit, free-flying space demonstration of several autonomy and survivability technologies.

(U) B. Program Change Summary (\$ in Thousands)

	FY 1994	FY 1995	FY 1996	FY 1997	Total Cost Cont
(U) Previous President's Budget	4,305	8,531	8,234	7,416	
(U) Appropriated Value	4,432	2,131			
(U) Adjustments to Appropriated Value					
a. Cong Gen Reductions	- 127	- 191			
b. SBIR	- 60	- 33			
c. Omnibus or Other Above Threshold Reprogram					
d. Below Threshold Reprogramming					
(U) Adjustments to Budget Years Since FY95 PB			- 8,234	- 7,416	
(U) Current Budget Submit/President's Budget	4,245	1,906	0	0	71,382

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

4 - Demonstration And Validation

0603438F Satellite Sys Survivability

(U) Change Summary Explanation:

Funding: FY 96 and on budget deleted to reflect Air Force decision to not proceed with further Dem/Val efforts.

Schedule: No change.

Technical: Congress zeroed and prohibited start of follow-on project.

(U) C. Other Program Funding Summary (\$ in Thousands)

Not Applicable.

Related RDT&E:

(U) PE #0603218C, BMDO Research and Support Activities

(U) PE #0603401F, Advance Spacecraft Technology

(U) D. Schedule Profile

	FY 1994		FY 1995		FY 1996		FY 1997	
	1	2	3	4	1	2	3	4
(U) MSTRS								
(U) Rqmts Review								
(U) TAOS								
(U) Launch/On-orbit Ops								
(U) Data Reduction/Analysis								

X

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February, 1995																																																						
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT																																																							
4 - Demonstration And Validation		0603438F Satellite Sys Survivability								2611																																																							
COST (In Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost																																																						
2611	Technology Insertion Plan & Analysis	448	100	0	0	.0	0	0	0	0	5,300																																																						
<p>(U) A. Mission Description and Budget Item Justification Planning, modeling, and analysis to meet current and projected space system survivability requirements versus both natural and hostile attack environments. Developed and applied software models and tools to evaluate and validate satellite survivability environmental responses and interactions to perform space asset survivability /vulnerability assessments. This activity was intended to provide the basis for identifying systems vulnerabilities and technology gaps. This program is Budget Activity Research Category Demonstration/Validation, because it supports on-orbit space prototype Dem/Val of advanced technologies.</p> <p>(U) <u>FY 1994</u> - (U) Update survivability technology insertion roadmap and investment strategy as required (\$448)</p> <p>(U) <u>FY 1995</u> - (U) Update survivability technology insertion roadmap and investment strategy as required (\$100).</p> <p>(U) <u>FY 1996</u>: Not Applicable.</p> <p>(U) <u>FY 1997</u>: Not Applicable.</p> <p>(U) B. Program Change Summary (\$ in Thousands)</p> <table border="0"> <tr> <td>(U) Previous President's Budget</td> <td><u>FY 1994</u></td> <td><u>FY 1995</u></td> <td><u>FY 1996</u></td> <td><u>FY 1997</u></td> <td>Total</td> </tr> <tr> <td>(U) Appropriated Value</td> <td>448</td> <td>0</td> <td></td> <td></td> <td><u>Cost</u></td> </tr> <tr> <td>(U) Adjustments to Appropriated Value</td> <td>448</td> <td>0</td> <td></td> <td></td> <td><u>Cont</u></td> </tr> <tr> <td> a. Cong Gen Reductions</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> b. SBIR</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> c. Omnibus or Other Above Threshold Reprogram</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> d. Below Threshold Reprogramming</td> <td></td> <td>+ 100</td> <td></td> <td></td> <td></td> </tr> <tr> <td>(U) Adjustments to Budget Years Since FY95 PB</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>(U) Current Budget Submit/President's Budget</td> <td>448</td> <td>100</td> <td></td> <td></td> <td>5,300</td> </tr> </table>												(U) Previous President's Budget	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>	Total	(U) Appropriated Value	448	0			<u>Cost</u>	(U) Adjustments to Appropriated Value	448	0			<u>Cont</u>	a. Cong Gen Reductions						b. SBIR						c. Omnibus or Other Above Threshold Reprogram						d. Below Threshold Reprogramming		+ 100				(U) Adjustments to Budget Years Since FY95 PB						(U) Current Budget Submit/President's Budget	448	100			5,300
(U) Previous President's Budget	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>	Total																																																												
(U) Appropriated Value	448	0			<u>Cost</u>																																																												
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a. Cong Gen Reductions																																																																	
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(U) Current Budget Submit/President's Budget	448	100			5,300																																																												

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February, 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
4 - Demonstration And Validation	0603438F Satellite Sys Survivability	2611	
<p>(U) Change Summary Explanation: Funding: Below Threshold Reprogramming reflects a realignment of \$100,000 from Project 2612 to Project 2611.</p> <p>Schedule: No change.</p> <p>Technical: No change.</p> <p>(U) C. <u>Other Program Funding Summary (\$ in Thousands)</u> Not Applicable.</p> <p>(U) D. <u>Schedule Profile</u> Not Applicable.</p>			

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February, 1995															
BUDGET ACTIVITY		PROJECT																
4 - Demonstration And Validation		2611																
		PE NUMBER AND TITLE																
		0603438F Satellite Sys Survivability																
<p>(U) A. <u>Project Cost Breakdown (\$ in Thousands)</u></p> <table border="1"> <thead> <tr> <th></th> <th><u>FY 1994</u></th> <th><u>FY 1995</u></th> <th><u>FY 1996</u></th> <th><u>FY 1997</u></th> </tr> </thead> <tbody> <tr> <td>(U) Sustaining Engineering Level of Effort</td> <td>448</td> <td>100</td> <td></td> <td></td> </tr> <tr> <td>(U) Total</td> <td>448</td> <td>100</td> <td></td> <td></td> </tr> </tbody> </table>					<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>	(U) Sustaining Engineering Level of Effort	448	100			(U) Total	448	100		
	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>														
(U) Sustaining Engineering Level of Effort	448	100																
(U) Total	448	100																
<p>(U) B. <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u> Not Applicable.</p>																		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

4 - Demonstration And Validation

0603438F Satellite Sys Survivability

2612

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
2612 Prototype Demonstrations	2,948	1,466	0	0	0	0	0	0	0	39,282

(U) A. Mission Description and Budget Item Justification

Develop satellite survivability technology prototypes and operational concepts to meet current and projected space system survivability validated mission requirements. This program is Budget Activity Research Category Demonstration/Validation, because it supports on-orbit space prototype Dem/Val of advanced technologies.

(U) FY 1994

- (U) Launched TAOS on Space Test Experiment Platform (STEP) Mission 0 using DARPA's Taurus launch vehicle; conduct on-orbit demonstrations of TAOS; begin TAOS payload mission analysis (\$2,948).

(U) FY 1995

- (U) Complete TAOS on-orbit operations, analysis and reporting (\$1,466).

(U) FY 1996: Not Applicable.(U) FY 1997: Not Applicable.(U) B. Program Change Summary (\$ in Thousands)

	FY 1994	FY 1995	FY 1996	FY 1997
(U) Previous President's Budget	3,008	8,531	8,234	7,416
(U) Appropriated Value	3,008	2,131		
(U) Adjustments to Appropriated Value :				
a. Cong Gen Reductions	- 60	- 191		
b. SBIR		- 33		
c. Omnibus or Other Above Threshold Reprogram				
d. Below Threshold Reprogramming		- 441		
(U) Adjustments to Budget Years Since FY95 PB			- 8,234	- 7,416
(U) Current Budget Submit/President's Budget	2,948	1,466	0	0

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE _____

February, 1995

BUDGET ACTIVITY

PIPE NUMBER AND TITLE

4 - Demonstration And Validation

0603438F Satellite Sys Survivability

PROJECT

2612

(U) Change Summary Explanation:

Funding: Below Threshold Reprogramming reflects a realignment of \$100,000 from this project to Project 2611, a realignment of \$340,000 from this project to Project 2613, and a \$1,000 reduction. Adjustments to Budget Years Since FY95 PB reflects decision to not proceed further with Dem/Val efforts.

Schedule: No change.

Technical: Congress zeroed and prohibited start of follow-on project.

(U) C. Other Program Funding Summary (\$ in Thousands)

Not Applicable.

(U) D. Schedule Profile

1	2	<u>FY 1994</u>	3
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1

14

FY 1995	2	3
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4

1

FY 1996	2	3
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4

FY 1997	2	3
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4

(U) TAOS

(U) Launch/On-orbit Ops

(U) Data Reduction/Analysis

X-----X

X-----X

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)			DATE	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE		
4 - Demonstration And Validation		0603438F Satellite Sys Survivability		
(U) A. <u>Project Cost Breakdown (\$ in Thousands)</u>		FY 1994	FY 1995	FY 1996
(U) Sustaining Engineering Level of Effort		2,948	1,466	
(U) Total		2,948	1,466	
(U) B. <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u>				
Not Applicable.				

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February, 1995																																																						
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT																																																							
4 - Demonstration And Validation		0603438F Satellite Sys Survivability								2613																																																							
COST (In Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost																																																						
2613	Component Level Tech Applications	849	340	0	0	0	0	0	0	0	26,800																																																						
<p>(U) A. Mission Description and Budget Item Justification Developed and demonstrated critical technologies to improve survivability of space, ground, and communications segments of space systems. Objective was to ready critical technology component-level efforts for insertion into prototype system demonstrations. This program is Budget Activity Research Category Demonstration/Validation, because it supports on-orbit space prototype Dem/Val of advanced technologies.</p> <p>(U) <u>FY 1994</u> - (U) Component-level technology applications critical to overcoming vulnerabilities to disruption or degradation (\$849).</p> <p>(U) <u>FY 1995</u> - (U) Maintain key elements of the most promising component-level technologies for potential application to future space systems (\$340).</p> <p>(U) <u>FY 1996</u>: Not Applicable.</p> <p>(U) <u>FY 1997</u>: Not Applicable.</p> <p>(U) B. Program Change Summary (\$ in Thousands)</p> <table> <tr> <td>(U) Previous President's Budget</td> <td>FY 1994</td> <td>FY 1995</td> <td>FY 1996</td> <td>FY 1997</td> <td>Total Cost</td> </tr> <tr> <td>(U) Appropriated Value</td> <td>849</td> <td>0</td> <td>0</td> <td>0</td> <td></td> </tr> <tr> <td>(U) Adjustments to Appropriated Value</td> <td>849</td> <td>0</td> <td></td> <td></td> <td></td> </tr> <tr> <td> a. Cong Gen Reductions</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> b. SBIR</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> c. Omnibus or Other Above Threshold Reprogram</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> d. Below Threshold Reprogramming</td> <td></td> <td>+ 340</td> <td></td> <td></td> <td></td> </tr> <tr> <td>(U) Adjustments to Budget Years Since FY95 PB</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>(U) Current Budget Submit/President's Budget</td> <td>849</td> <td>340</td> <td></td> <td></td> <td>26,800</td> </tr> </table>												(U) Previous President's Budget	FY 1994	FY 1995	FY 1996	FY 1997	Total Cost	(U) Appropriated Value	849	0	0	0		(U) Adjustments to Appropriated Value	849	0				a. Cong Gen Reductions						b. SBIR						c. Omnibus or Other Above Threshold Reprogram						d. Below Threshold Reprogramming		+ 340				(U) Adjustments to Budget Years Since FY95 PB						(U) Current Budget Submit/President's Budget	849	340			26,800
(U) Previous President's Budget	FY 1994	FY 1995	FY 1996	FY 1997	Total Cost																																																												
(U) Appropriated Value	849	0	0	0																																																													
(U) Adjustments to Appropriated Value	849	0																																																															
a. Cong Gen Reductions																																																																	
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d. Below Threshold Reprogramming		+ 340																																																															
(U) Adjustments to Budget Years Since FY95 PB																																																																	
(U) Current Budget Submit/President's Budget	849	340			26,800																																																												

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	PROJECT
BUDGET ACTIVITY	PE NUMBER AND TITLE		
4 - Demonstration And Validation	0603438F Satellite Sys Survivability		2613
<p>(U) Change Summary Explanation: Funding: Below Threshold Reprogramming reflects a realignment of \$340,000 from Project 2612 to Project 2613</p> <p>Schedule: No change.</p> <p>Technical: No change.</p> <p>(U) C. <u>Other Program Funding Summary (\$ in Thousands)</u> Not Applicable.</p> <p>(U) D. <u>Schedule Profile</u> Not Applicable.</p>			

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	PROJECT
BUDGET ACTIVITY	PE NUMBER AND TITLE		
4 - Demonstration And Validation	0603438F Satellite Sys Survivability		2613
 (U) A. <u>Project Cost Breakdown (\$ in Thousands)</u>			
		<u>FY 1994</u>	<u>FY 1995</u>
			<u>FY 1996</u>
			<u>FY 1997</u>
(U) Sustaining Engineering Level of Effort		849	340
(U) Total		849	340
 (U) B. <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u>			
Not Applicable.			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

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BUDGET ACTIVITY

PE NUMBER AND TITLE

4 - Demonstration And Validation

0603441F Space Based InfraRed (SBIR) Dem/Val

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0	111,838	130,744	126,369	127,367	144,283	119,390	119,363	Continuing	TBD
0007 Space & Missile Tracking System	0	106,838	114,824	119,404	124,382	144,283	119,390	119,363	Continuing	TBD
0008 Cobra Brass	0	5,000	15,920	6,965	2,985	0	0	0	0	30,870

(U) A. Mission Description and Budget Item Justification

(U) The purpose of the Space Based InfraRed System (SBIRS) program is to develop a system which provides increased performance over the existing Defense Support Program (DSP) system. The system's primary mission is to provide initial warning of a ballistic missile attack on the US. SBIRS will incorporate new technologies that would enhance detection, provide direct reporting of ICBM/SLBM and tactical ballistic missile launches, and provide critical mid-course tracking and discrimination data for national and theater missile defense. The integrated system architecture consists of sensors located in Geosynchronous Orbits (GEO), Highly Elliptical Orbits (HEO) and Low Earth Orbits (LEO) and an integrated, centralized ground station serving all space elements of the SBIR System, as well as DSP. PE #604441F funds SBIRS Engineering and Manufacturing Development activities.

(U) This PE funds the SBIRS Development activities: Space and Missile Tracking System (SMTS) and Cobra Brass (CB). SMTS (formerly Brilliant Eyes) is the Dem/Val effort for the LEO component of SBIRS, CB will provide data for the GEO and HEO components. This program is in the demonstration and validation Budget Activity Research Category because it funds the risk reduction and an advanced technology demonstration system.

(U) Acquisition Strategy:

(U) The SBIRS program is managed through a single consolidated System Program Office (SPO) at the Space and Missile Systems Center, Los Angeles Air Force Base, CA. The SMTS Flight Demonstration System (FDS) acquisition plan was approved in Aug 92. The Flight Demonstration System (FDS) contract is scheduled to be awarded in 1995, and the two FDS satellites are scheduled to be launched into a low earth orbit by 4Q FY98.

(U) CB is currently being developed by Sandia National Laboratory, Albuquerque, NM. CB is planning to launch in FY98.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE
BUDGET ACTIVITY		
4 - Demonstration And Validation		
PE NUMBER AND TITLE		
0603441F Space Based InfraRed (SBIR) Dem/Val		
(U) B. Program Change Summary (\$ in Thousands)		
(U) Previous President's Budget	FY 1994	FY 1995
(U) Appropriated Value		125,000
(U) Adjustments to Appropriated Value		117,000
a. Cong Gen Reductions		- 2,968
b. SBIR		- 2,165
c. Omnibus or Other Above Threshold Reprogram		- 29
d. Below Threshold Reprogramming		
(U) Adjustments to Budget Years Since FY95 PB		- 49,256
(U) Current Budget Submit/President's Budget		130,744
		111,838
(U) Change Summary Explanation:		
Funding: Adjustments to Budget Years Since FY95 PB in FY96 and FY97 reflect a decrease (\$180,000,000 in FY96, \$150,000,000 in FY97) due to the transfer of Project 3616 to PE #604441F, an increase (\$131,400,000 in FY96, \$127,000,000 in FY97) due to the combination of SBIRS Development activities, and a decrease (\$656,000 in FY96, \$631,000 in FY97) due to inflation changes.		
Schedule:	No Changes.	
Technical:	No Changes.	
(U) C. Other Program Funding Summary (\$ in Thousands)		
Not Applicable.		
Related RDT&E:		
(U) PE #604441F - Space Based InfraRed System (SBIRS) - EMD		
(U) PE #305911F - Defense Support Program (DSP)		
(U) PE #603871C - Advanced Tech. Dev. - National Missile Defense		
(U) PE #604856C - Patriot PAC-3 EMD		
(U) PE #603861C - THAAD Dem/Val		
(U) PE #603867C - Navy Lower Tier Development		
(U) PE #603868C - Navy Upper Tier Development		

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BUDGET ACTIVITY

PE NUMBER AND TITLE

4 - Demonstration And Validation

0603441F Space Based InfraRed (SBIR) Dem/Val

(U) D. Schedule Profile

	FY 1994		FY 1995		FY 1996		FY 1997	
	1	2	3	4	1	2	3	4
(U) SBIRS Pre-EMD Review								
(U) SMTS FDS Authority To Proceed								
(U) SMTS FDS Preliminary Design Review (PDR)								
(U) SMTS FDS Critical Design Review (CDR)								
(U) Cobra Brass Launch (FY98)								
(U) SMTS FDS Launch (4Q FY98)								

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February, 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT		
4 - Demonstration And Validation		0603441F Space Based InfraRed (SBIR) Dem/Val								0007		
COST (In Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
0007	Space & Missile Tracking System	0	106,838	114,824	119,404	124,382	144,283	119,390	119,363	Continuing	TBD	
<p>(U) A. Mission Description and Budget Item Justification</p> <p>(U) The Space and Missile Tracking System (SMTS), formerly known as Brilliant Eyes, represents the Low Earth Orbit (LEO) component of the Space Based InfraRed System (SBIRS). The objective SMTS constellation of low-earth orbiting satellites will provide global, below- and above-the-horizon access to strategic and tactical ballistic missiles in boost, post-boost, and midcourse phases of flight, and also track missile targets during reentry. SMTS will support the four SBIRS mission areas of Missile Warning, Missile Defense, Technical Intelligence, and Battle Space Characterization.</p> <p>(U) Prior to FY94, the Ballistic Missile Defense Organization (BMDO) funded SMTS (then Brilliant Eyes) with PE #603217C. In FY94, management and funding responsibility of the Brilliant Eyes program was transferred to the Air Force. FY94 funding for Brilliant Eyes (\$136,919) was provided in PE #603440F.</p> <p>(U) <u>FY 1994</u> (\$136,919: Accomplished with funding in PE #603440F)</p> <ul style="list-style-type: none"> - (U) Restructured SMTS FDS Request For Proposals (RFP) Development - (U) Continued life testing 60 Kelvin cryocoolers - (U) Demonstrated focal plane arrays, processors, and 60 GHz communications components - (U) Completed Anti-Ballistic Missile (ABM) Treaty compliance review (Apr 94) - (U) Amended SMTS FDS RFP for downselect (Dec 94) <p>(U) <u>FY 1995</u></p> <ul style="list-style-type: none"> - (U) Award SMTS FDS supplemental agreement for space and ground segment development (Mar 95) - (U) Continue design & develop of the FDS satellite and ground segment (\$62,096) - (U) Non-flying contractor conduct ground experiments (\$2,917) - (U) Program office activities (\$11,004) - (U) Complete ABM Treaty compliance review (Mar 95) - (U) Continue technology efforts in cryocoolers, focal plane arrays and 32 bit RAD hard processors (\$7,500) - (U) Simulation, Discrimination, and computer support (\$15,464) - (U) Data Analysis for Midcourse Space Experiment (MSX) and Support for RAMOS (\$7,857) - (U) Conduct Preliminary Design Review (PDR) (Sep 95) 												

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

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PE NUMBER AND TITLE

PROJECT

4 - Demonstration And Validation

0603441F Space Based InfraRed (SBIR) Dem/Val

0007

(U) FY 1996

- (U) Continue SMTS FDS satellite and ground segment development (\$85,501)
- (U) Continue work for non-flying contractor (\$5,000)
- (U) Program office activities (\$13,523)
- (U) Simulation, Discrimination, and computer support (\$10,800)
- (U) Conduct Critical Design Review (CDR) (Sep 96)

(U) FY 1997

- (U) Continue SMTS FDS satellite and ground segment development (\$91,732)
- (U) Continue work for non-flying contractor (\$5,000)
- (U) Program office activities (\$13,522)
- (U) Simulation, Discrimination, and computer support (\$9,150)

(U) Acquisition Strategy:

(U) The GEO component of the SBIRS program is a pilot for acquisition streamlining. For the GEO component the traditional Defense Acquisition Board (DAB) documentation for an ACAT ID program is being consolidated into a Single Acquisition and Management Plan (SAMP).

(U) While SMTS and Cobra Brass are part of the overall SBIRS, there are on going contracts for each of these efforts. The SMTS Flight Demonstration System (FDS) acquisition plan was approved in Aug 92. The streamlined acquisition program established by the SBIRS GEO component pre-EMD phase will be used by SMTS when it enters EMD, after a successful deployment decision in FY00.

(U) The developing organization for the SMTS FDS satellites is the Air Force Space and Missile Center, Los Angeles AFB, CA. An FDS flyer contract will be awarded to a single contractor who will design and build two FDS satellites to be launched in 4Q FY98. Major contractors competing for the FDS flyer contract are Rockwell International, Space Systems Division, Downey, CA and TRW, Redondo Beach, CA. An FDS non-flyer contract will also be awarded. There is a two year test period leading up an FY00 DoD deployment decision for an operational SMTS constellation for SBIRS. The non-flyer will participate with the FDS flying contractor in ground experiments to mitigate overall program technical risk as well as to maintain competition.

(U) Pre-EMD activities would begin in late FY99 with approximately three pre-EMD study contracts. The purpose of pre-EMD would be to develop specifications and designs for the objective SMTS. This period would also be used to re-optimize the SBIRS HEO, GEO, LEO constellations, and to revalidate the AFSPACOM Operational Requirements Document. If a decision is made to deploy an operational SMTS in FY00, then the pre-EMD contractors would compete for the EMD contract - to be awarded in FY02. The same streamlined acquisition approach being used currently for the GEO EMD would be used as a baseline for the LEO EMD as well.

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE	
4 - Demonstration And Validation		0603441F Space Based InfraRed (SBIR) Dem/Val	0007
(U) B. Program Change Summary (\$ in Thousands)			
(U) Previous President's Budget	FY 1995	FY 1996	FY 1997
(U) Appropriated Value	0	0	0
(U) Adjustments to Appropriated Value	112,000		
a. Cong Gen Reductions	- 2,968		
b. SBIR	- 2,165		
c. Omnibus or Other Above Threshold Reprogram	- 29		
d. Below Threshold Reprogramming			
(U) Adjustments to Budget Years Since FY95 PB		+ 114,824	+ 119,404
(U) Current Budget Submit/President's Budget	106,838	114,824	119,404
			Continuing
(U) Change Summary Explanation:			
Funding: Project 0007 was created in FY94 under PE 63440F. In FY 95 the Project 0007 was moved to this PE. Adjustments to Budget Year Since FY95 PB reflects an increase for SMTS FDS which was transferred from BMDO to the Air Force.			
Schedule: Not Applicable.			
Technical: Not Applicable.			
(U) C. Other Program Funding Summary (\$ in Thousands)			
Not Applicable.			
(U) D. Schedule Profile			
(U) SMTS FDS Downselect	FY 1994	FY 1995	FY 1996
(U) SMTS FDS PDR	1 2 3 4 1	2 3	2 3
(U) SMTS FDS CDR		X	
(U) FDS Launch (4Q FY98)			X
			4 1 2 3 4

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

4 - Demonstration And Validation

0603441F Space Based InfraRed (SBIR) Dem/Val

0007

(U) A. Project Cost Breakdown (\$ in Thousands)

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FDS satellite and ground segment		62,096	85,501	91,732
(U) Non-flying contractor ()		2,917	5,000	5,000
(U) Program office activities ()		11,004	13,523	13,522
(U) Technology efforts ()		7,500	0	0
(U) Sim., Discrim., & computer support ()		15,464	10,800	9,150
(U) Data Analysis for MSX and Support for RAMOS		7,857	0	0
(U) Total		106,838	114,824	119,404

Note: FY94 Accomplished with funds from PE #603440F

(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)Performing Organizations:

Contractor or Government Performing Activity	Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1994	Budget FY 1994	Budget FY 1995	Budget FY 1996	Budget FY 1997	Budget to Complete	Total Program

Product Development Organizations

FDS Contract	CPAF	TBD	TBD	TBD	See Note	See Note	62,096	85,501	91,732	Continued	TBD
Misc.	Various	Various	Continued	Continued	See Note	See Note	36,179	29,323	27,672	Continued	TBD

Note: FY94 Accomplished with funds from PE 603440F

Support and Management Organizations

Aerospace	Various	Continued	Continued	Continued	See Note	See Note	8,563	8,563	8,563	Continued	TBD
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Test and Evaluation Organizations

Not Applicable

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)			DATE	February, 1995	PROJECT
BUDGET ACTIVITY	PE NUMBER AND TITLE				
4 - Demonstration And Validation	06034441F Space Based InfraRed (SBIR) Dem/Val				0007
(U) B. <u>Budget Acquisition History and Planning Information Continued (\$ in Thousands)</u>					
Government Furnished Property: Not Applicable.					
Subtotal Product Development	See Note	See Note	98,275	Continued	TBD
Subtotal Support and Management	See Note	See Note	8,563	Continued	TBD
Subtotal Test and Evaluation (Not Applicable)					
Total Project	See Note	See Note	106,838	Continued	TBD
Note: FY94 Accomplished with funds from PE 603440F					

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

4 - Demonstration And Validation

0603441F Space Based InfraRed (SBIR) Dem/Val

0008

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
0008 Cobra Brass	0	5,000	15,920	6,965	2,985	0	0	0	0	30,870

(U) A. Mission Description and Budget Item Justification

(U) The Cobra Brass (CB) Program is a DIA/CMO (Central MASINT Office) Research and Development program to explore the utility of staring, fast framing, multi-spectral electro-optical sensors. This approach represents a significant departure from the traditional approach of scanning, slow framing, single band sensors which have traditionally been used for Tactical Warning and Attack Assessment (TW/AA).

(U) Previous CB sensors have demonstrated the ability of this technology to contribute to both the Theater Missile Defense (TMD), Technical Intelligence (TI), and Battlespace Characterization (BC) missions. A major emphasis of this program will be to increase the timeliness of sensor tasking and reporting. This will allow CB data to be processed in real-time through the existing theater infrastructure. CB will support the GEO and HEO component of the SBIRS.

(U) FY 1995

- (U) System Concept Review (Feb 95)
- (U) Payload Design Review (\$500)
- (U) Ground Station Design Review (\$3,500)
- (U) Test Unit (\$1,000)

(U) FY 1996

- (U) Payload (\$10,320)
- (U) Test Unit (\$1,000)
- (U) Ground Station Build 1 (\$4,100)
- (U) Satellite (I&CO) (\$500)

(U) FY 1997

- (U) Payload (\$2,400)
- (U) Satellite Inspection & Checkout (\$1,500)
- (U) Payload delivered (Dec 96)
- (U) Ground Station Build 1 & 2 (\$3,065)
- (U) Ground Station testing complete (Mar 97)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

4 - Demonstration And Validation

0603441F Space Based InfraRed (SBIR) Dem/Val

0008

(U) B. Program Change Summary (\$ in Thousands)

	FY 1994	FY 1995	FY 1996	FY 1997	Total Cost
(U) Previous President's Budget	0	0	0	0	0
(U) Appropriated Value		5,000			
(U) Adjustments to Appropriated Value					
a. Cong Gen Reductions					
b. SBIR					
c. Omnibus or Other Above Threshold Reprogram					
d. Below Threshold Reprogramming			+ 15,920	+ 6,965	
(U) Adjustments to Budget Years Since FY95 PB			15,920	6,965	Continuing
(U) Current Budget Submit/President's Budget	0	5,000			

(U) Change Summary Explanation:

Funding: Project 0008 was established in FY94 under this Program Element. Adjustments to Budget Year Since FY95 PB reflects an increase for Cobra Brass which was transferred to this Program Element.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. Other Program Funding Summary (\$ in Thousands)

Not Applicable.

(U) D. Schedule Profile

	FY 1994			FY 1995			FY 1996			FY 1997		
	1	2	3	1	2	3	1	2	3	1	2	3
(U) System Concept Review												
(U) Payload Design Review												
(U) Ground Station Design Review												
(U) Payload Consent to Ship Decision												
(U) Grd Station Build 1 Testing Complete at Sandia												
(U) Grd Station Build 1 Installed at Ground Site												
(U) CB Launch (FY98)												

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

4 - Demonstration And Validation

0603441F Space Based InfraRed (SBIR) Dem/Val

0008

(U) A. Project Cost Breakdown (\$ in Thousands)

	FY 1994	FY 1995	FY 1996	FY 1997
(U) Payload	0	500	10,320	2,400
(U) Ground Station	0	3,500	4,100	3,065
(U) Test Unit	0	1,000	1,000	0
(U) Satellite I&CO	0	0	\$500	1,500
(U) Total	0	5,000	15,920	6,965

(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)Performing Organizations:

Contractor or Government Performing Activity	Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1994	Budget FY 1994	Budget FY 1995	Budget FY 1996	Budget FY 1997	Budget to Complete	Total Program
<u>Product Development Organizations</u>											
Sandia National Labs	Various	Various	\$30,870	\$30,870	\$0	\$0	\$5,000	\$15,920	\$6,965	\$2,985	\$30,870
<u>Support and Management Organizations</u>											
Not Applicable											
<u>Test and Evaluation Organizations</u>											
Not Applicable											

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)			DATE		February, 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE		PROJECT		
4 - Demonstration And Validation		0603441F Space Based InfraRed (SBIR) Dem/Val		0008		
(U) B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)						
Government Furnished Property: Not Applicable						
Subtotal Product Development						
		0	0	5,000	15,920	6,965
		0	0	0	0	2,985
		0	0	0	0	0
		0	0	0	0	0
Total Project		0	0	5,000	15,920	2,985
						30,870

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE											
#3, Advanced Development		PE 0603601F, Conventional Weapons Technology											
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost			
Total PE 0603601F Cost	16,567	30,652	31,637	30,278	31,721	30,953	31,882	33,826	Cont	Cont			
Project 670A, Ordnance Technology	11,847	17,754	18,812	17,994	19,544	15,684	16,505	16,964	Cont	Cont			
Project 670B, Guidance Technology	4,720	12,898	12,825	12,284	12,177	15,269	15,377	16,862	Cont	Cont			
<p>A. (U) <u>Mission Description and Budget Item Justification:</u> This Advanced Development program develops air-to-surface and air-to-air conventional weapons technologies including guidance, ordnance, and aeromechanics. This program develops the following technologies: autonomous, adverse-weather advanced guidance seekers; fuzes; insensitive and less sensitive explosives; hard target warheads; explosives, bombs, submunitions, and their dispensing mechanisms; guns and ammunition; air-to-surface composite weapon airframes; smart submunitions; weapon ordnance subsystems; and instrumentation. Hardware/software for advanced technologies are developed and evaluated to determine effectiveness and potential operational value. All efforts in this program element contain the resources necessary, including civilian salaries, to manage, conduct, and document the technical activities.</p>													

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE	
#3, Advanced Development		PE 0603601F, Conventional Weapons Technology	
B. (U) <u>Program Change Summary (\$ in Thousands):</u>			
Previous President's Budget		FY 1994	FY 1995
Appropriated Value		17,367	35,100
Adjustments to Appropriated Value:		17,464	31,250
a. Congressional General Reductions			-598
b. SBIR		-97	
c. Omnibus Reprogramming		-200	
d. Below Threshold Reprogramming		-500	
Current President's Budget		-100	
		16,567	30,652
			31,637
			30,278
			31,394
			Total
			Cost
			Cont
Change Summary Explanation:			
Funding: Increase in FY 1995 and out funding due to increased Air Force priority in conventional weapons technology.			
Schedule: Not Applicable.			
Technical: Not Applicable.			
C. (U) <u>Other Program Funding Summary:</u> Not Applicable.			
D. (U) <u>Schedule Profile:</u> Not Applicable.			

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY		PE NUMBER AND TITLE								DATE	PROJECT NO.
#3, Advanced Development		PE 0603601F, Conventional Weapons Technology								February 1995	670A
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Project 670A, Ordnance Technology	11,847	17,754	18,812	17,994	19,544	15,684	16,505	16,964	Cont	Cont	
<p>A. (U) <u>Mission Description and Budget Item Justification:</u> This project develops and demonstrates the feasibility, effectiveness, and operational utility of conventional (non-nuclear) ordnance technologies for current and future air-delivered weapons. The project develops the following technologies: fuzes; insensitive and less sensitive explosives; hard target warheads; explosives, bombs, submunitions, and their dispensing mechanisms; guns and ammunition; air-to-surface composite weapon airframes; smart submunitions; weapon ordnance subsystems; and instrumentation.</p> <p>(U) <u>FY 1994:</u></p> <ul style="list-style-type: none"> - (U) Continued to develop advanced air-delivered munition and submunition technologies for components, subsystems, and systems to increase performance, lethality, safety, affordability, and supportability. (\$10,361K) -- (U) Completed design of a multimode warhead that can detonate in long rod penetrators, aeroballistic slugs, or multiple fragments, depending upon the optimum kill mechanism for the target. -- (U) Demonstrated an octant azimuthal-sensing target detection device for improved burst point control in future air-to-air missiles. - (U) Continued to demonstrate advanced ordnance, weapon airframe and carriage, and instrumentation technologies for air-to-air and air-to-surface munitions and submunitions to demonstrate operational effectiveness. (\$1,486K) -- (U) Completed fabrication of a dual mode launcher and demonstrated compatibility for both missile ejection and rail launch which will reduce logistics costs associated with two separate launchers. -- (U) Coupled a low-cost, anti-jam, Global Positioning System (GPS) with an Inertial Navigation System (INS) to investigate GPS guidance in a jammed environment. <p>(U) <u>FY 1995:</u></p> <ul style="list-style-type: none"> - (U) Continue to develop advanced air-delivered munition and submunition technologies for components, subsystems, and systems to increase performance, lethality, safety, affordability, and supportability. (\$12,663K) -- (U) Perform integration of antimateriel multimode warhead components (case, explosive, and fireset) to develop a warhead for future antimateriel submunitions which is highly effective against all mobile ground targets. -- (U) Perform large scale testing of agent defeat kill mechanism to develop weapon payloads for defeating chemical and biological weapons. -- (U) Expand envelope for the smart hard target fuze to improve burst point control for different sized weapons. -- (U) Complete the demonstration of an improved ordnance package, (i.e., target detection device, electronic safe and arm, and warhead) for future upgrades of air-to-air missiles. 											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.
#3, Advanced Development	PE 0603601F, Conventional Weapons Technology	670A
<p>- (U) Continue to demonstrate advanced ordnance, weapon airframe and carriage, and instrumentation technologies for air-to-air and air-to-surface munitions and submunitions to demonstrate operational effectiveness. (\$5,091K)</p> <p>-- (U) Design and begin fabrication of an affordable Global Positioning System/Inertial Navigation system (GPS/INS) system which improves GPS accuracy in a jammed environment.</p> <p>-- (U) Evaluate concepts for advanced suspension and release equipment for future fighter aircraft which will reduce size, weight, and supportability issues associated with conventional pyrotechnic racks, maximize weapon loadout, and reduce drag and radar cross section.</p> <p>(U) <u>FY 1996:</u></p> <p>- (U) Continue to develop advanced air-delivered munition and submunition technologies for components, subsystems, and systems to increase performance, lethality, safety, affordability, and supportability. (\$12,271K)</p> <p>-- (U) Complete final integrated design of an anti-material submunition (e.g., warhead, seeker, submunition airframe, etc.) to demonstrate advanced antimateriel submunition technology which is highly effective against all mobile ground targets.</p> <p>-- (U) Complete design of a general purpose bomb with an insensitive explosive and an improved fuze that can be stored indefinitely with the fuze installed.</p> <p>-- (U) Complete design and begin fabrication of an active hard target smart fuze to determine optimum burst point during the penetration event.</p> <p>-- (U) Perform large scale testing of agent defeat kill mechanism to develop weapon payloads for defeating chemical and biological weapons.</p> <p>- (U) Continue to demonstrate advanced ordnance, weapon airframe and carriage, and instrumentation technologies for air-to-air and air-to-surface munitions and submunitions to demonstrate operational effectiveness. (\$6,541K)</p> <p>-- (U) Complete subsystem testing of an affordable anti-jam GPS/INS and integrate it into a weapons airframe for flight test to enable GPS accuracy in a jammed environment.</p> <p>-- (U) Complete design and begin fabrication an advanced suspension and release equipment for future fighter aircraft which will reduce size, weight, and supportability issues associated with conventional pyrotechnic racks, maximize weapon loadout, and reduce drag and radar cross section.</p>		

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

#3, Advanced Development

PE 0603601F, Conventional Weapons Technology

670A

(U) FY 1997:

- (U) Continue to develop advanced air-delivered munition and submunition technologies for components, subsystems, and systems to increase performance, lethality, safety, affordability, and supportability. (\$8,945K)
- (U) Complete in-house testing of an anti-material submunition and fabrication of instrumented and live-fire units for flight testing to demonstrate advanced antimateriel submunition technology which is highly effective against all mobile ground targets.
- (U) Complete design of an active fuze for autonomous target identification and optimum detonation against hard targets such as runways, buildings, and above-ground bunkers to provide a single hard target ordnance package capable of defeating above-ground or shallow-buried hard targets.
- (U) Fabricate a general purpose bomb with an insensitive explosive and an improved fuze that can be stored indefinitely with the fuze installed.
- (U) Complete demonstration of an active hard target smart fuze to determine optimum burst point during the penetration event.
- (U) Continue to demonstrate advanced ordnance, weapon airframe and carriage, and instrumentation technologies for air-to-air and air-to-surface munitions and submunitions to demonstrate operational effectiveness. (\$9,049K)
- (U) Integrate and ground test an anti-jam Global Positioning System/Inertial Navigation system (GPS/INS) demonstration unit in a weapon flight test vehicle.
- (U) Complete fabrication and initiate ground testing of suspension and release equipment for future fighter aircraft which will reduce size, weight and supportability issues associated with conventional pyrotechnic racks, maximize weapon loadout, and reduce drag and radar cross section.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	PROJECT NO.																		
BUDGET ACTIVITY	PE NUMBER AND TITLE																				
#3, Advanced Development	PE 0603601F, Conventional Weapons Technology		670A																		
<p>B. (U) <u>Program Change Summary (\$ in Thousands):</u></p> <table border="0"> <thead> <tr> <th></th> <th>FY 1994</th> <th>FY 1995</th> <th>FY 1996</th> <th>FY 1997</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Previous President's Budget</td> <td>11,847</td> <td>22,450</td> <td>19,941</td> <td>20,784</td> <td>Cost</td> </tr> <tr> <td>Current President's Budget</td> <td>11,847</td> <td>17,754</td> <td>18,812</td> <td>17,994</td> <td>Cont</td> </tr> </tbody> </table> <p>Change Summary Explanation: Funding: Increase in FY 1995 and out due to increased Air Force priority in conventional weapons technology.</p> <p>Schedule: Not Applicable.</p> <p>Technical: Not Applicable.</p> <p>C. (U) <u>Other Program Funding Summary:</u></p> <p>(U) <u>Related Activities:</u></p> <ul style="list-style-type: none"> - (U) PE 0602602F, Conventional Munitions. - (U) PE 0602111N, Anti-Air/Anti-Surface Warfare Technology. - (U) PE 0603792N, Advanced Technology Demonstrations. - (U) PE 0604407D, Joint Standoff Weapon. - (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication. <p>D. (U) <u>Schedule Profile:</u> Not Applicable.</p>					FY 1994	FY 1995	FY 1996	FY 1997	Total	Previous President's Budget	11,847	22,450	19,941	20,784	Cost	Current President's Budget	11,847	17,754	18,812	17,994	Cont
	FY 1994	FY 1995	FY 1996	FY 1997	Total																
Previous President's Budget	11,847	22,450	19,941	20,784	Cost																
Current President's Budget	11,847	17,754	18,812	17,994	Cont																

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DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

#3, Advanced Development

PE 0603601F, Conventional Weapons Technology

PROJECT NO.

670B

COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Project 670B, Guidance Technology	4,720	12,898	12,825	12,284	12,177	15,269	15,377	16,862	Cont	Cont

A. (U) Mission Description and Budget Item Justification: This project develops and demonstrates affordable, autonomous, and adverse-weather advanced guidance technologies for conventional air-to-air and air-to-surface armament. Objectives include: increased accuracy, adverse-weather operation; real-time targeting and battle damage assessment (BDA); enhanced target classification/identification; standoff delivery munitions; detection and "lock-on" of reduced signature targets; improved survivability; more reliable system operation; improved countermeasure performance; and enhanced affordability.

(U) FY 1994:

- (U) Continued to develop and demonstrate affordable, autonomous, and adverse-weather advanced guidance air-to-surface seekers. (\$2,320K)
- -- (U) Completed data analysis for laser radar (LADAR) seeker captive flight test and evaluated LADAR utility in steep approach angles for direct attack munitions.
- -- (U) Evaluated synthetic aperture radar's utility in steep approach angles for direct attack munitions.
- (U) Continued to develop and demonstrate technologies for real-time targeting of advanced guidance seekers. (\$1,400K)
- (U) Continued to develop technologies to distinguish enemy forces from friendly forces and provide real-time BDA. (\$1,000K)
- -- (U) Completed design and conducted subcomponent testing of a high-fidelity, wideband, two-color, infrared scene projector for use in imaging infrared sensor development and test.

(U) FY 1995:

- (U) Continue to develop and demonstrate affordable, autonomous, and adverse-weather advanced air-to-surface guidance technologies. (\$9,398K)
- -- (U) Complete preliminary design of a five-cubic-inch optical correlator (as powerful as a Cray supercomputer) coupled with a LADAR to enable autonomous target identification in a cluttered environment.
- -- (U) Evaluate concepts for an advanced synthetic aperture radar guidance terminal seeker for upgrades of direct attack and standoff munitions.
- -- (U) Complete preliminary design of an advanced digital electronic processor for weapons seeker applications, suitable for air-to-surface and counterair guided munition applications; tera-op (10¹² operations per second) throughput capability will be demonstrated.
- -- (U) Complete low-cost anti-armor design of tactical size, solid-state, pulsed LADAR sensor for use in antimateriel submunition, and conduct flight test demonstrations for the LADAR sensor, guidance algorithms, and submunition airframe.
- (U) Continue to develop and demonstrate technologies for real-time targeting by advanced guidance seekers. (\$2,000K)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE PE 0603601F, Conventional Weapons Technology	PROJECT NO. 670B
<p>#3, Advanced Development</p> <ul style="list-style-type: none"> - (U) Continue to develop and demonstrate advanced guidance technologies and affordable, reliable components to counter the next generation air-to-air threats. (\$1,500K) -- (U) Fabricate and test a high-fidelity, wideband, two-color, infrared scene projector for use in imaging infrared sensor development and test. -- (U) Complete preliminary design of a conformal array seeker that utilizes an antenna that conforms to the missile aeroskin, enabling smaller missile diameters and improved aerodynamic performance. <p>FY 1996:</p> <ul style="list-style-type: none"> (U) Continue to develop and demonstrate affordable, autonomous, and adverse-weather advanced air-to-surface guidance technologies. (\$9,025K) -- (U) Complete detailed design of a five-cubic-inch optical correlator (as powerful as a Cray supercomputer) coupled with a LADAR to enable autonomous target identification in a cluttered environment. -- (U) Conduct detailed integration analysis and design for an affordable, adverse-weather capable, autonomous, precision synthetic aperture radar (SAR) guidance seeker. -- (U) Complete design and fabricate an advanced digital electronic processor for weapons seeker applications, suitable for air-to-surface and counterair guided munition applications; demonstrate tera-op (10¹² operations per second). - (U) Continue to develop and demonstrate advanced guidance technologies for hardened, time-critical targets. (\$2,900K) -- (U) Demonstrate concepts for real-time targeting investigation in the advanced synthetic aperture radar seeker program. - (U) Continue to develop and demonstrate advanced guidance technologies and affordable, reliable components to counter the next generation air-to-air threats. (\$900K) -- (U) Demonstrate initial operating capability for the primary high-fidelity, wideband, two-color, infrared scene projector for use in imaging infrared sensor development and test. -- (U) Complete breadboard fabrication of a conformal array seeker that utilizes an antenna that conforms to the missile aeroskin, enabling smaller missile diameters and improved aerodynamic performance. 		

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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.
#3, Advanced Development	PE 0603601F, Conventional Weapons Technology	670B

<p>(U) FY 1997:</p> <ul style="list-style-type: none"> - (U) Continue to develop and demonstrate affordable, autonomous, and adverse-weather advanced air-to-surface guidance technologies. (\$9,784K) -- (U) Fabricate and ground test an optical correlator and laser radar for autonomous target identification in a cluttered environment. -- (U) Fabricate and captive flight test an affordable, autonomous, adverse-weather capable, synthetic aperture radar seeker. -- (U) Demonstrate via simulation an advanced digital electronic processor for weapons seeker applications, suitable for air-to-surface and counter-air guided munition applications; demonstrate tera-op throughput capability. - (U) Continue to develop and demonstrate advanced guidance technologies for hardened, time-critical targets. (\$2,000K) -- (U) Demonstrate for user evaluation real-time targeting in conjunction with the advanced SAR seeker program. - (U) Continue to develop and demonstrate advanced guidance technologies and affordable, reliable components to counter the next generation air-to-air threats. (\$500K) -- (U) Complete secondary operating capability for the high-fidelity, wideband, two-color, infrared scene projector for use in imaging infrared sensor development and test. -- (U) Complete demonstration of a conformal array seeker that utilizes an antenna the conforms to the missile aeroskin, enabling smaller missile diameters and improved aerodynamic performance.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995																		
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.																			
#3, Advanced Development	PE 0603601F, Conventional Weapons Technology	670B																			
<p>B. (U) <u>Program Change Summary (\$ in Thousands):</u></p> <table border="0"> <thead> <tr> <th></th> <th>FY 1994</th> <th>FY 1995</th> <th>FY 1996</th> <th>FY 1997</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Previous President's Budget</td> <td>4,720</td> <td>12,650</td> <td>10,825</td> <td>10,610</td> <td>Cost</td> </tr> <tr> <td>Current Budget Submit/President's Budget</td> <td>4,720</td> <td>12,898</td> <td>12,825</td> <td>12,284</td> <td>Cont</td> </tr> </tbody> </table>					FY 1994	FY 1995	FY 1996	FY 1997	Total	Previous President's Budget	4,720	12,650	10,825	10,610	Cost	Current Budget Submit/President's Budget	4,720	12,898	12,825	12,284	Cont
	FY 1994	FY 1995	FY 1996	FY 1997	Total																
Previous President's Budget	4,720	12,650	10,825	10,610	Cost																
Current Budget Submit/President's Budget	4,720	12,898	12,825	12,284	Cont																
<p>Change Summary Explanation:</p> <p>Funding: Increase in FY 1995 and out is due to priority placed on developing affordable, autonomous, and adverse-weather advanced guidance technologies.</p> <p>Schedule: Not Applicable.</p> <p>Technical: Not Applicable.</p>																					
<p>C. (U) <u>Other Program Funding Summary:</u></p> <p>(U) <u>Related Activities:</u></p> <ul style="list-style-type: none"> - (U) PE 0602111N, Anti-Air/Anti-Surface Warfare Technology. - (U) PE 0603792N, Advanced Technology Demonstrations. - (U) PE 0604618F, Joint Direct Attack Munitions. - (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication. 																					
<p>D. (U) <u>Schedule Profile:</u> Not Applicable.</p>																					

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DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

3 - Advanced Development

0603605F Advanced Weapons Technology

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	91,115	93,590	47,919	46,624	50,421	50,470	49,928	51,413	Continuing	Continuing
3150 Advanced Optics Technology	32,968	30,242	2,210	2,118	2,811	2,914	2,923	3,111	Continuing	Continuing
3151 High Power Semiconductor Laser Technology	9,057	10,292	7,994	8,175	9,567	9,567	9,566	9,862	Continuing	Continuing
3152 High Power Microwave Technology	18,916	20,852	10,728	10,781	11,046	11,146	11,144	11,440	Continuing	Continuing
3277 Systems Survivability Technology	300	0	0	0	0	0	0	0	0	1,800
3647 High Energy Laser Technology	29,874	32,204	26,987	25,550	26,997	26,843	26,295	27,000	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification: This Advanced Development program demonstrates advanced directed energy and optical imaging concepts. Speed-of-light weapons and long-range, high resolution optical imaging through the turbulent atmosphere offer significant payoffs for many Air Force missions, such as theater missile defense, suppression of enemy air defenses, and space control. This program has demonstrated many major technology breakthroughs such as removing atmospheric distortions from optical transmissions (e.g., laser beams) and in producing small, relatively high power laser diode phased arrays. Major emphasis areas include: high power microwave and high energy laser technologies; long-range optical imaging; and high power laser diodes and diode arrays. All efforts in this program element contain the resources necessary, including civilian salaries, to manage, conduct, and document the technical activities.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)				DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE			
3 - Advanced Development		0603605F Advanced Weapons Technology			
(U) B. <u>Program Change Summary (\$ in Thousands):</u>					
		FY 1994	FY 1995	FY 1996	FY 1997
(U) Previous President's Budget		93,690	59,500	56,120	57,368
(U) Appropriated Value		94,715	96,500		
(U) Adjustments to Appropriated Value					
a. Congressional General Reductions		-1,025	-2,910		
b. SBIR		-1,301			
c. Below Threshold Reprogrammings		-1,274			
(U) Current President's Budget		91,115	93,590	47,919	46,624
					Total
					Cost
					Cont
(U) Change Summary Explanation:					
Funding: For FY 1995, Congress added \$20 million for excimer laser technology and \$17 million for laser radar. The FY 1996 budget request reflects Air Force technology development needs that are required by the warfighter.					
Schedule: Not Applicable.					
Technical: Not Applicable.					
(U) C. <u>Other Program Funding Summary:</u> Not Applicable.					
(U) D. <u>Schedule Profile:</u> Not Applicable.					

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
3 - Advanced Development		0603605F Advanced Weapons Technology								3150	
COST (In Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
3150	Advanced Optics Technology	32,968	30,242	2,210	2,118	2,811	2,914	2,923	3,111	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification: This project develops advanced optical technologies for identifying distant or dim objects. This work supports high energy laser technologies since an imaging subsystem is required for target verification, accurate and sustainable laser beam placement on target, and damage assessment. Advanced technologies including nonlinear optics, adaptive optics, and specialized signal processing are being developed. The goal is high quality optical image reconstruction, concentrating on removing turbulent atmosphere-induced distortions. Many of these developed technologies (both techniques and hardware) also have significant application to astronomy research.

(U) FY 1994:

- (U) Continued advanced optical imaging technology development and demonstrations that support applications such as space object identification. (\$2,935K)
- (U) Demonstrated high resolution optical imaging of low earth orbit satellites in daytime.
- (U) Fielded daytime imaging capability at Air Force Maui Optical Station to support operational tasking as a contributing sensor to the Space Surveillance Network.
- (U) Completed development of low light visible sensor and image recovery algorithms to support daytime imaging applications.
- (U) Continued work to develop and implement techniques to exploit optical images of satellites to support space object identification/mission payload assessment applications. (\$1,500K)
- (U) Finalized design for first generation work station to exploit optical images.
- (U) Continued development of nonlinear optics technologies for optical imaging. (\$1,286K)
- (U) Transitioned nonlinear optics technology for sodium wavelength beacon laser from in-house development to a contracted effort for scaling to higher power.
- (U) Transitioned nonlinear optics compensated imaging technology from in-house development and testing to a contracted effort for advanced development demonstration.
- (U) Continued upgrades/demonstrations at the Air Force Maui Optical Site, HI, and the Malabar, FL, optical sites. (\$286K)
- (U) Complete integration of daytime imaging capability at Maui site to support operational tasking as a contributing sensor to the Space Surveillance Network.
- (U) Continued development of the excimer-based active imaging technology. (\$9,230K)
- (U) Completed final design and began fabrication of receiver hardware for an Active Imaging Testbed.
- (U) Completed risk reduction experiments for candidate illuminator laser concepts and selected one concept for fabrication.
- (U) Began illuminator laser fabrication to support active imaging field tests.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
3 - Advanced Development	0603605F Advanced Weapons Technology	3150	
-	(U) Continued development of the laser imaging, detection, and ranging field demonstration. (\$17,731K)		
-	(U) Completed initial field tests of tunable laser to evaluate performance.		
-	(U) Conducted low-power laser ranging and remote sensing proof-of-concept field tests at the Air Force Maui Optical Station.		
-	(U) Completed preliminary design of scaled laser source to support field demonstrations of laser ranging, imaging, and remote sensing.		
(U) FY 1995:			
-	(U) Continue advanced optical imaging technology development and demonstrations that support applications such as space object imaging. (\$850K)		
-	(U) Produce first high resolution satellite images on 3.5 meter telescope using speckle image sensing and reconstruction.		
-	(U) Conduct initial field tests of daylight imaging concepts using adaptive optics for atmospheric compensation.		
-	(U) Evaluate alternatives and select most promising concept for accurate satellite temperature sensing from ground-based sensors.		
-	(U) Begin formal Imaging and Sensors Mission Study to evaluate mission payoff and technology requirements for advanced optical imaging across the spectrum of military applications.		
-	(U) Continue work to develop and implement techniques to exploit optical images of satellites to support space object imaging/mission payload assessment applications. (\$1,000K)		
-	(U) Deliver first-generation workstation for optical image exploitation to U.S. Space Command Combined Intelligence Center.		
-	(U) Continue development of nonlinear optics technologies for non-mechanical corrections in optical imaging. (\$980K)		
-	(U) Demonstrate feasibility of nonlinear optics image compensation for laser guidestar applications using sodium wavelength laser concepts at ten watt power level.		
-	(U) Continue upgrades/demonstrations at the Air Force Maui Optical Site, HI, and the Malabar, FL, optical sites. (\$412K)		
-	(U) Demonstrate feasibility of optical site networking to rapidly produce multiplier optical images of low earth orbit satellites to support space object identification applications.		
-	(U) Continue development of the excimer-based active imaging technology. (\$10,000K)		
-	(U) Complete illuminator laser development and delivery.		
-	(U) Complete active imaging receiver/tracker integration with 3.5 meter telescope at Starfire Optical Range.		
-	(U) Conduct initial active imaging field tests and demonstrations.		
-	(U) Continue development of the laser imaging, detection, and ranging field demonstration. (\$17,000K)		
-	(U) Complete design, fabrication, and delivery of full-scale laser source.		
-	(U) Conduct full-scale tests and demonstrations of laser ranging and imaging for low earth orbit satellites at the Air Force Maui Optical Station.		
-	(U) Complete modifications to laser system to incorporate wavelength agility in support of remote sensing applications.		
(U) FY 1996:			
-	(U) Continue advanced optical imaging technology development and demonstrations that support applications such as space object identification. (\$1,549K)		
-	(U) Demonstrate daylight imaging concepts using adaptive optics for atmospheric compensation.		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - Advanced Development	0603605F Advanced Weapons Technology	3150
<p>(U) Downselect to single concepts for active and passive imaging for application to deep space (out to geosynchronous altitudes) space object imaging/mission payload assessment missions.</p> <p>(U) Identify and begin development of key concepts and technology for focused development and transition to high-payoff applications for optical sensing, imaging, and stand-off detection.</p> <p>(U) Define and demonstrate deep space imaging concepts.</p> <p>(U) Demonstrate advanced electro-optical exploitation software tool.</p> <p>(U) Continue development of nonlinear optics technologies for non-mechanical corrections in optical imaging. (\$561K)</p> <p>(U) Integrate nonlinear optics imaging brassboard with 1.5 meter telescope at Starfire Optical Range.</p> <p>(U) Continue upgrades/demonstrations at Air Force Maui Optical Site, HI, and the Malabar, FL, optical sites. (\$100K)</p> <p>(U) Evaluate the potential of laser imaging, detection, and ranging (LIDAR) technology as a permanent addition to the Maui capabilities for space object surveillance and identification.</p> <p>(U) FY 1997:</p> <p>(U) Continue advanced optical imaging technology development and demonstrations that support applications such as space object imaging. (\$1,638K)</p> <p>(U) Demonstrate accurate temperature sensing of low earth orbit satellites using ground-based sensors.</p> <p>(U) Continue demonstration programs to address requirements for space object identification/mission payload assessment out to geosynchronous altitudes.</p> <p>(U) Conduct initial demonstrations to address feasibility of specific high-payoff applications for optical sensing, imaging, and stand-off detection.</p> <p>(U) Continue development of nonlinear optics for non-mechanical corrections in optical imaging. (\$380K)</p> <p>(U) Evaluate and demonstrate nonlinear optics brassboard for full-aperture compensation on 1.5 meter telescope at Starfire Optical Range.</p> <p>(U) Continue upgrades/demonstrations at the Air Force Maui Optical Site, HI, and the Malabar, FL, optical sites. (\$100K)</p> <p>(U) Begin integration of newly-completed 3.67 meter telescope at Maui into site control systems to allow routine use as a new contributing sensor for the Space Surveillance Network.</p>		

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3 - Advanced Development

0603605F Advanced Weapons Technology

PROJECT

3150

(U) B. Program Change Summary (\$ in Thousands):

(U) Previous President's Budget
(U) Current President's Budget

	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>	
	34,640	5,000	5,000	5,200	Cost
	32,968	30,242	2,210	2,118	Cont
					Cont
					Total

(U) Change Summary Explanation:

Funding: The FY 1996 budget request reflects Air Force technology development needs that are required by the warfighter. FY 1995 includes \$10 million Congressional add for excimer laser technology and \$17 million Congressional add for the laser imaging, detection, and ranging field demonstration.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0305160F, Defense Meteorological Satellite Program.
(U) PE 0602102F, Materials.
(U) PE 0602601F, Phillips Laboratory.
(U) This project has been coordinated through the Project Reli-

(U) D. Schedule Profile: Not Applicable.

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3 - Advanced Development

0603605F Advanced Weapons Technology

3151

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
3151 High Power Semiconductor Laser Technology	9,057	10,292	7,994	8,175	9,567	9,567	9,566	9,862	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification: This project continues to yield revolutionary breakthroughs in compact, robust, affordable laser system technology, which is being developed and transitioned for a wide range of military applications requiring small compact laser sources with low to moderate optical power. Near-term applications include compact, reliable infrared sources for use with night vision systems, battlefield surgery instruments, and covert communication systems. Longer term applications, up to and including weapon applications, focus on compact higher power sources. This project leads development and builds upon a wide range of commercial advancements. Commercially available semiconductor lasers (1/10 watt) are widely used due to their low-cost, small size and weight, high reliability, and high efficiency in converting electricity to laser energy. The project preserves these attractive features while scaling to the higher powers (one to ten watts and above) and/or military application-specific wavelengths required for a wide range of applications. The project is divided into three technology areas. First, it investigates methods to increase output power from individual semiconductor laser diodes. Second, it develops wavelength-specific laser array integration methods, which produce a single, high quality laser beam at significantly higher power levels. Third, it develops wave-length-specific laser diodes for military applications. This project also works directly with field users to develop proof-of-capability demonstrations and field tests for these revolutionary laser sources. This technology has many commercial applications, especially for eye-safe lasers.

(U) FY 1994:

- (U) Continued development of laser diodes for improved performance/higher power in single diode and array applications. (\$1,890K)
- (U) Achieved five watts (pulsed) near diffraction-limited power and 7.5 watts continuous wave power from a master oscillator power amplified single device.
- (U) Continued development of coherent laser diode arrays for improved performance/higher power in array applications. (\$2,844K)
- (U) Successfully phased a laser array of approximately 1000 diodes for improved performance/higher power in array applications.
- (U) Successfully phased a 9x100 array of diode lasers in a master oscillator power amplifier configuration.
- (U) Continued development of high power laser diodes and diode arrays at alternate wavelengths that will be transitioned to military applications. (\$4,323K)
- (U) Successfully developed the first mid-infrared diode laser array.
- (U) Demonstrated quantum-well diode laser operating at 40 degrees kelvin and four micron wavelength.
- (U) Demonstrated room temperature operation of a single diode laser at over one watt output power and two microns wavelength.

(U) FY 1995:

- (U) Continue development of laser diodes for improved performance/higher power in single diode and array applications. (\$2,213K)
- (U) Demonstrate ten watts continuous wave power with good beam quality from a single broad-area diode laser.

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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
3 - Advanced Development	0603605F Advanced Weapons Technology	3151	
Complete development and demonstrate one kilowatt diode-pumped solid-state laser brassboard for active tracking illumination at the Starfire Optical Range.			
-	(U) Continue development of coherent laser diode arrays for improved performance/higher power in array applications. (\$3,659K)		
-	(U) Demonstrate a suitable array architecture that can be scaled to the 50-100 watt power level by FY 1996.		
-	(U) Continue development of high power laser diodes and diode arrays at alternate wavelengths that will be transitioned to military applications. (\$4,120K)		
-	(U) Demonstrate one watt continuous wave, diffraction-limited output at 2.1 microns wavelength.		
-	(U) Demonstrate 0.1 watt continuous wave output power at 4.2 microns wavelength.		
-	(U) Continue to investigate applications for these advanced semiconductor laser diodes and diode arrays. (\$300K)		
-	(U) Transition the Field Medical Laser System and Medical (Med) Pen to a commercial partner for commercialization.		
(U) FY 1996:			
-	(U) Continue development of laser diodes for improved performance/higher power in single diode and array applications. (\$2,962K)		
-	(U) Demonstrate three watts of continuous power from a single aperture.		
-	(U) Demonstrate devices that will have the potential to be modulated and scaled to higher powers.		
-	(U) Demonstrate coupling to single mode fibers at moderate power levels.		
-	(U) Continue development of coherent laser diodes and diode arrays for improved performance/higher power in array applications. (\$2,577K)		
-	(U) Demonstrate 50 watts continuous power from a phased array of diode lasers.		
-	(U) Demonstrate the ruggedness and reliability of a high power system with a one cubic foot laser head.		
-	(U) Continue development of high power laser diode arrays at alternate wavelengths that will be transitioned to military applications such as sources for illuminators and infrared countermeasures. (\$2,077K)		
-	(U) Demonstrate lasing of one watt laser diode at a four micron wavelength.		
-	(U) Demonstrate single longitudinal mode operation at a wavelength of 3.3 microns.		
-	(U) Continue to investigate applications for these advanced semiconductor laser diodes and diode arrays. (\$378K)		
-	(U) Transition semiconductor laser technology to the Ballistic Wind Program.		
-	(U) Investigate visible laser technology to update access denial and medical devices.		
-	(U) Demonstrate material systems and laser architectures that are scaleable to 50 watts at mid-infrared wavelengths.		
(U) FY 1997:			
-	(U) Continue development of laser diodes for improved performance/higher power in single diode and array applications. (\$2,805K)		
-	(U) Demonstrate five watts of continuous power from a single aperture.		
-	(U) Demonstrate coupling to single mode fibers at high power levels.		
-	(U) Demonstrate devices that will have the potential to be modulated and scaled to high powers.		
-	(U) Continued development of coherent laser diode arrays for improved performance/higher power in array applications. (\$2,300K)		

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- (U) Demonstrate 100 watts of continuous power from a phased array of diode lasers.
- (U) Demonstrate the salability of a one cubic foot laser head to 200 watts.
- (U) Develop high power laser diodes and diode arrays at alternate wavelengths that will be transitioned to military applications such as sources for illuminators and infrared countermeasures. (\$2,570K)
- (U) Demonstrate lasing of 100 milliwatts at a wavelength of five microns.
- (U) Continue to investigate applications for these advanced semiconductor laser diodes and diode arrays. (\$500K)
- (U) Investigate blue/green diode laser technology for underwater communications, optical memory, and flat panel displays.
- (U) Investigate a space illuminator application.

(U) B. Program Change Summary (\$ in Thousands):

	FY 1994	FY 1995	FY 1996	FY 1997	Total
(U) Previous President's Budget	10,250	6,348	6,900	6,900	Cost
(U) Current President's Budget	9,057	10,292	7,994	8,175	Cont
					Cont

(U) Change Summary Explanation:

Funding: The FY 1996 budget request reflects Air Force technology development needs that are required by the warfighter.

Schedule: Not Applicable.

Technical: Not Applicable.

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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - Advanced Development	0603605F Advanced Weapons Technology	3151
<p>(U) C. <u>Other Program Funding Summary:</u></p> <ul style="list-style-type: none"> (U) <u>Related Activities:</u> <ul style="list-style-type: none"> - (U) PE 0602102F, Materials. - (U) PE 0602204F, Aerospace Avionics. - (U) PE 0602601F, Phillips Laboratory. - (U) PE 0602234N, Systems Support Technology. - (U) Representatives from Army, Navy, Ballistic Missile Defense Organization, National Laboratories, and Air Force using commands are members of the government review team for this technology. - (U) Joint field demonstrations of this technology are ongoing with: the Air Force Pararescue School; the Air Force Special Operations Command; the U.S. Coast Guard; and the U.S. Customs Service. - (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication. <p>(U) D. <u>Schedule Profile:</u> Not Applicable.</p>		

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BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
3 - Advanced Development		0603605F Advanced Weapons Technology								3152	
COST (In Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
3152	High Power Microwave Technology	18,916	20,852	10,728	10,781	11,046	11,146	11,144	11,440	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification: This project develops high power microwave generation technologies. It also develops a susceptibility/vulnerability/lethality data base to identify potential vulnerabilities of U.S. systems to high power microwave threat parameters and to provide a basis for future weaponization decisions. Representative U.S. and foreign assets will be tested to understand real system susceptibilities. Both wideband (wide frequency range) and narrowband (very small frequency range) technologies are being developed. The technologies developed in this project will demonstrate the applicability of high power microwaves to support various missions such as suppression of enemy air defense, counter-air, command and control warfare, and aircraft self-protection.

(U) FY 1994:

- (U) Continued technology development of generic high power microwave hardware. (\$2,865K)
- (U) Obtained 20 gigawatts power from ultra-wideband hydrogen switched source.
- (U) Obtained one gigawatt peak power from ultra-wideband gallium arsenide solid-state source.
- (U) Continued efforts evaluating the susceptibility of military hardware and software to high power microwave. (\$500K)
- (U) Completed preliminary suicide/fratricide assessment of F-16.
- (U) Completed initial susceptibility investigations for integrated air defense systems.
- (U) Began efforts addressing suppression of enemy air defense systems for burnout of enemy internal electronics. (\$1,820K)
- (U) Demonstrated radio frequency energy extraction from plasma filled magnetically insulated line oscillator.
- (U) Began tests of specific air defense systems electronic hardware.
- (U) Continued efforts addressing aircraft self-protection technologies. (\$3,931K)
- (U) Completed in-depth analysis of F-16 testbed aircraft.
- (U) Took delivery of electronically steerable ultra-wideband high power microwave source.
- (U) Expanded high power microwave effects database with respect to infrared guided missiles.
- (U) Adapted several engagement models to include high power microwave effects.
- (U) Completed experiment on active denial technology. (\$1,300K)
- (U) Completed L-band hardware for active denial technology demonstration.
- (U) Continued development of the laser-induced microwave emissions program using excimer laser technology. (\$8,500K)
- (U) Developed tailored laser sources for testing.
- (U) Began testing materials and components.

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	PROJECT
BUDGET ACTIVITY	PE NUMBER AND TITLE		
3 - Advanced Development	0603605F Advanced Weapons Technology		3152
(U) FY 1995:			
-	(U) Continue technology development of generic high power microwave hardware. (\$1,912K)		
-	(U) Continue to develop narrowband and wideband high power microwave sources and antennas for various applications.		
-	(U) Continue efforts evaluating the susceptibility of representative military hardware and software to high power microwave effects. (\$500K)		
-	(U) Complete aircraft shelter radio frequency penetration effects.		
-	(U) Complete ultra-wideband F-16 radio frequency effects.		
-	(U) Characterize current-generation jet engine control systems.		
-	(U) Transition frequency mode-stir techniques to aircraft and automobile industry that reduces time in conducting susceptibility tests by 90%.		
-	(U) Continue efforts addressing suppression of enemy air defenses systems. (\$1,915K)		
-	(U) Begin weapons application experiment design.		
-	(U) Downselect high power microwave narrowband source.		
-	(U) Conduct experiments on selected integrated air defense assets.		
-	(U) Continue efforts addressing aircraft self-protection technologies. (\$3,025K)		
-	(U) Develop detailed weapons application design.		
-	(U) Downselect high power microwave wideband source.		
-	(U) Continue testing and dynamic simulations of infrared and radio frequency guided missiles.		
-	(U) Design an experiment proof-of-concept.		
-	(U) Complete active denial technology demonstration. (\$1,800K)		
-	(U) Complete X-band hardware for active denial technology demonstration.		
-	(U) Focus efforts addressing command and control warfare, space control, and counter-air technologies. (\$1,200K)		
-	(U) Begin development of wideband submunition concept for command and control warfare disruption mission.		
-	(U) Explore ultra-high power wideband high power microwave weapons concept for electronics damage.		
-	(U) Continue development of communications equipment effects database and begin database on aircraft maintenance and avionics equipment.		
-	(U) Continue development of the laser-induced microwave emissions program using excimer laser technology. (\$10,500K)		
-	(U) Perform laser-induced microwave emissions experiments on simulated systems.		
-	(U) Develop short pulse source for laser-induced microwave emissions.		
(U) FY 1996:			
-	(U) Continue technology development of generic high power microwave hardware. (\$1,951K)		
-	(U) Continue development of narrowband and wideband high power microwave sources and antennas.		
-	(U) Continue efforts evaluating the susceptibility of representative military hardware and software to high power microwave effects. (\$500K)		
-	(U) Conduct studies of electromagnetic propagation through facilities.		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
3 - Advanced Development	0603605F Advanced Weapons Technology	3152	
	<ul style="list-style-type: none">- (U) Complete data base on various ground and flightline maintenance equipment.- (U) Complete susceptibility report for large U.S. aircraft and begin hardening criteria development.- (U) Complete experiments to determine coupling of high power microwave energy into hangers.- (U) Continue efforts addressing suppression of enemy air defense systems. (\$1,615K)- (U) Conduct low power coupling and high power damage experiments on selected integrated air defense assets.- (U) Refine system parameter requirements and perform go/no go decision.- (U) Continue efforts addressing aircraft self-protection technologies. (\$2,000K)- (U) Develop host aircraft hardening criteria.- (U) Complete wideband source/antenna design integration.- (U) Design source experiment.- (U) Continue testing and dynamic simulations of guided missiles.- (U) Continue efforts addressing command and control warfare and counter-air technologies. (\$2,310K)- (U) Continue development of compact wideband sources and antennas for both damage and disruption missions.- (U) Perform limited in situ experiments on command/control/communications equipment in building/facilities.- (U) Extend materials studies to in situ effects applications.- (U) Continue development of the laser-induced microwave emissions program. (\$1,400K)- (U) Develop an integrated response model of the laser-induced microwave emissions phenomenon.- (U) Conduct experiments on actual systems.- (U) Conduct feasibility experiments of laser-induced microwave emissions applications.- (U) Continue development of high power microwave space control technologies. (\$952K)- (U) Initiate application concept studies.		
(U) FY 1997:			
-	(U) Continue technology development of generic high power microwave hardware. (\$1,771K)		
-	(U) Continue development of narrowband and wideband high power microwaves sources and antennas.		
-	(U) Continue efforts evaluating the susceptibility of representative military hardware and software to high power microwave effects. (\$500K)		
-	(U) Complete database on foreign aircraft.		
-	(U) Complete hardening criteria on large U.S. aircraft.		
-	(U) Conduct experiments of electromagnetic propagation through facilities.		
-	(U) Continue efforts addressing suppression of enemy air defenses. (\$2,100K)		
-	(U) Conduct experiments on selected integrated air defense assets.		
-	(U) Complete concept design of technology demonstration.		

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)			DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE	PROJECT	
3 - Advanced Development		0603605F Advanced Weapons Technology	3152	
<ul style="list-style-type: none"> - (U) Begin source technology integration. - (U) Continue efforts addressing aircraft self-protection technologies. (\$1,755K) - (U) Initiate hardening requirements on the experimental platform. - (U) Conduct experiment to demonstrate protection technologies. - (U) Prepare plan to transition technology to system program offices. - (U) Continue efforts addressing command and control warfare and counter-air technologies. (\$2,125K) - (U) Finalize wideband source and pulse power designs. - (U) Continue equipment characterization. - (U) Develop effects database on foreign aircraft maintenance and avionics equipment. - (U) Continue development of the laser-induced microwave emissions program. (\$1,500K) - (U) Develop an integrated response model of the laser-induced microwave emissions phenomenon. - (U) Conduct experiments on actual systems and develop draft hardening specifications. - (U) Conduct feasibility experiments. - (U) Continue development of high power microwave space control technologies. (\$1,030K) - (U) Continue application concept studies. 				

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
3 - Advanced Development	0603605F Advanced Weapons Technology	3152	
(U) B. <u>Program Change Summary (\$ in Thousands):</u>			
(U) Previous President's Budget	FY 1994	FY 1995	FY 1996
(U) Current President's Budget	20,000	11,500	11,000
	18,916	20,852	10,728
			FY 1997
			11,300
			10,781
			Total
			Cost
			Cont
			Cont
(U) Change Summary Explanation:			
Funding: The FY 1996 budget request reflects Air Force technology development needs that are required by the warfighter. FY 1995 was increased by Congressional adds of \$10 million for excimer laser technology and \$1.5 million for enhanced high power microwave technology.			
Schedule: Not Applicable.			
Technical: Not Applicable.			
(U) C. <u>Other Program Funding Summary:</u>			
(U) <u>Related Activities:</u>			
- (U) PE 0602202F, Human Systems Technology.			
- (U) PE 0602601F, Phillips Laboratory.			
- (U) PE 0602120A, Electronic Survivability and Fuzing Technology.			
- (U) PE 0602111N, Anti-Air Warfare, Anti-Surface Warfare Technology.			
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.			
(U) D. <u>Schedule Profile:</u> Not Applicable.			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
3 - Advanced Development		0603605F Advanced Weapons Technology								3277	
	COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
3277	Systems Survivability Technology	300	0	0	0	0	0	0	0	0	1,800

(U) A. Mission Description and Budget Item Justification: This project developed technologies to evaluate and enhance Air Force systems electromagnetic pulse survivability. The project has been terminated.

(U) FY 1994:

- (U) Demonstrated technologies for simulating electromagnetic pulses. (\$300K)

(U) FY 1995: Not Applicable.

(U) FY 1996: Not Applicable.

(U) FY 1997: Not Applicable.

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February 1995

PE NUMBER AND TITLE

3 - Advanced Development

0603605F Advanced Weapons Technology

3277

(U) B. Program Change Summary (\$ in Thousands):

(U) Previous President's Budget	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>	Total
	300	0	0	0	Cost
(U) Current President's Budget	300	0	0	0	1,800
					1,800

(U) Change Summary Explanation:

Funding: Project terminated in FY 1995.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. Other Program Funding Summary: Not Applicable.

(U) D. Schedule Profile: Not Applicable.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
3 - Advanced Development		0603605F Advanced Weapons Technology								3647	
COST (In Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
3647	High Energy Laser Technology	29,874	32,204	26,987	25,550	26,997	26,843	26,295	27,000	Continuing	Continuing

(U) **A. Mission Description and Budget Item Justification:** This project develops and demonstrates technology and conducts detailed assessments needed for high energy laser weapons. The technology developed by this project is directly applicable to most high power applications. The project demonstrates the critical technologies for: scaleable laser devices; optical components; and laser beam control to efficiently compensate and propagate laser radiation through the atmosphere to a target. It also develops and uses detailed computational models to establish high energy laser weapon effectiveness and satellite and missile vulnerability. Correcting the laser beam for atmospheric disturbances is the key technology in most high energy laser applications. The beam control technology developed in this project had, and will continue to have, a significant benefit to the astronomy community.

(U) FY 1994:

- (U) Continued development and demonstration of high energy laser device components for potential weapon applications. (\$3,339K)
- (U) Demonstrated high pressure operation of small-scale chemical oxygen-iodine laser device, providing a concept to simplify and reduce weight of pressure recovery systems.
- (U) Demonstrated long run times on small-scale chemical oxygen-iodine laser device with stable power output and thermal control.
- (U) Optimized hardware configuration and operating conditions on small-scale chemical oxygen-iodine laser device, resulting in two times increase in laser power per unit flow area and three times increase in output laser power.
- (U) Demonstrated high performance optical coatings for chemical oxygen-iodine laser wavelength with extremely low absorption while maintaining low scatter and excellent environmental stability.
- (U) Continued atmospheric compensation/beam control experiments, including activation of the new 3.5 meter telescope. (\$12,142K)
- (U) Demonstrated improved satellite and star tracking performance through the use of adaptive optics for atmospheric compensation.
- (U) Completed integration and activation of new 3.5 meter telescope, including collecting first light images of astronomical objects and demonstrating the ability to accurately point to low earth orbit satellites.
- (U) Began development of second-generation adaptive optics hardware for 3.5 meter telescope.
- (U) Completed initial extended beacon atmospheric compensation test in ground-based field testing which simulates the high altitude propagation path for theater missile defense scenarios.
- (U) Continued atmospheric measurements and characterization of the high energy laser beam propagation environment from ground and airborne platforms. (\$10,000K)
- (U) Obtained coincident strength-of-turbulence measurements between airborne measurements and ground-based measurements to confirm the validity of radar turbulence measurements database.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
3 - Advanced Development	0603605F Advanced Weapons Technology	3647	
-	(U) Built and integrated all hardware to support detailed airborne horizontal path atmospheric characterization experiments planned for FY 1995.		
-	(U) Continued vulnerability assessments for potential high energy laser targets. (\$2,893K)		
-	(U) Completed testing of sub-scale, mid-scale, and full-scale targets for laser vulnerability of theater missiles at three different government laser facilities.		
-	(U) Completed assessments of three satellite targets.		
-	(U) Developed methodology for quantifying systematic uncertainties in satellite component designs and system-level response to component-level degradation.		
-	(U) Completed test program on four satellite components; identified temporary effects and energy thresholds for permanent instead of temporary effects.		
-	(U) Acquired optical analysis codes and evaluated vulnerability of a satellite optical system.		
-	(U) Continued development of excimer laser technology supporting the laser-induced microwave emissions program. (\$1,500K)		
-	(U) Delivered moderate-power, frequency agile laser source which meets power requirements for laser-induced microwave emissions phenomenology tests.		
(U) FY 1995:			
-	(U) Continue development and demonstration of high energy laser components for potential weapon applications. (\$3,592K)		
-	(U) Test advanced chemical oxygen-iodine laser spray generator concept at moderate-scale to measure key performance parameters.		
-	(U) Evaluate beam quality of moderate-scale chemical oxygen-iodine laser devices operating at high pressure.		
-	(U) Continue atmospheric compensation/beam control experiments from ground-based platforms. (\$19,028K)		
-	(U) Complete development and installation of first-generation adaptive optics system on 3.5 meter telescope and conduct first atmospheric compensation experiments.		
-	(U) Demonstrate real-time compensation for tilt anisoplanatism on 1.5 meter telescope.		
-	(U) Conduct first field experiments on 1.5 meter telescope to evaluate hybrid beacon sensing for atmospheric compensation, validating the baseline concept for full-scale, ground-based laser beam control systems.		
-	(U) Complete development of one kilowatt track illuminator laser and begin installation at Starfire Optical Range.		
-	(U) Develop long-wave infrared sensor and demonstrate long-wave infrared sensor acquisition of satellites.		
-	(U) Integrate improved tracker into existing ground-based hardware to evaluate performance of integrated tracking/atmospheric compensation in field testing which simulates the high altitude, horizontal propagation path for theater missile defense scenarios.		
-	(U) Continue atmospheric measurements and characterization of the high energy laser beam propagation environment from ground and airborne platforms. (\$6,352K)		
-	(U) Complete high altitude airborne flights to obtain optical measurements of atmospheric turbulence along long horizontal propagation paths.		
-	(U) Continue development of excimer laser technology supporting the laser-induced microwave emissions program. (\$1,500K)		
-	(U) Complete evaluation of laser-induced microwave emissions phenomenology to establish feasibility for operational applications.		
-	(U) Continue vulnerability assessments for potential high energy laser targets. (\$1,732K)		
-	(U) Complete ground tests against full-scale theater missile targets.		
-	(U) Complete technical report documentation on assessment results on past six satellite targets.		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
3 - Advanced Development	0603605F Advanced Weapons Technology	3647	
<p>— (U) Incorporate uncertainty methodology into satellite vulnerability assessment process.</p> <p>— (U) Complete three new satellite models and vulnerability assessments.</p> <p>— (U) Perform vulnerability analysis on two satellite optical systems.</p>			
<p>(U) <u>FY 1996:</u></p> <p>— (U) Continue development and demonstration of high energy laser components for potential weapon applications. (\$4,245K)</p> <p>— (U) Integrate advanced chemical oxygen-iodine laser generator to demonstrate scaled performance.</p> <p>— (U) Continue atmospheric compensation/beam control experiments from ground-based platforms to support applications ranging from weaponization to space object identification. (\$21,230K)</p> <p>— (U) Using newly-installed one kilowatt track illuminator laser, demonstrate active tracking of low earth orbit satellites with 3.5 meter telescope.</p> <p>— (U) Evaluate synergistic effects between atmospheric compensation and active tracking of satellite targets.</p> <p>— (U) Demonstrate and evaluate the performance of hybrid beacon sensing on 3.5 meter telescope.</p> <p>— (U) Demonstrate 24-hour passive acquisition of low earth orbit satellites using long wavelength infrared acquisition sensor.</p> <p>— (U) Continue development of next generation adaptive optics for the 3.5 meter telescope.</p> <p>— (U) Complete integrated tracking/atmospheric compensation experiments in static ground testing.</p> <p>— (U) Conduct active tracking experiments against dynamic targets simulating the theater missile defense scenario.</p> <p>— (U) Continue vulnerability assessments for potential high energy laser targets. (\$1,512K)</p>			
<p>(U) <u>FY 1997:</u></p> <p>— (U) Continue development and demonstration of high energy laser components for potential weapon applications. (\$3,030K)</p> <p>— (U) Complete scaled experiments of chemical oxygen-iodine laser device to demonstrate performance of advanced generators and high pressure operation.</p> <p>— (U) Continue atmospheric compensation/beam control experiments from ground-based platforms to support applications ranging from weaponization to space object imaging. (\$21,020K)</p> <p>— (U) Complete development and installation of scaled sodium wavelength laser to support full-scale hybrid beacon sensing for 3.5 m telescope.</p> <p>— (U) Conduct initial ground-based laser integrated beam control demonstrations against selected low earth orbit satellites (up to 400 kilometers).</p> <p>— (U) Continue satellite active tracking experiments, to evaluate synergistic effects with atmospheric compensation, investigate phenomenology of satellite target illumination for various targets and engagements, and demonstrate 24-hour satellite tracking capability.</p> <p>— (U) Complete development and begin installation of next generation adaptive optics for the 3.5 meter telescope.</p> <p>— (U) Complete active tracking experiments with advanced hardware and track algorithms against dynamic targets simulating the theater missile defense scenario.</p> <p>— (U) Continue vulnerability assessments for potential high energy laser targets. (\$1,500K)</p>			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

3 - Advanced Development

0603605F Advanced Weapons Technology

3647

(U) B. Program Change Summary (\$ in Thousands):

	FY 1994	FY 1995	FY 1996	FY 1997	Total
(U) Previous President's Budget	28,500	36,652	33,220	33,968	Cost
(U) Current President's Budget	29,874	32,204	26,987	25,550	Cont
					Cont

(U) Change Summary Explanation:

Funding: The FY 1996 budget request reflects Air Force technology development needs that are required by the warfighter.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0602601F, Phillips Laboratory.
- (U) PE 0603319F, Airborne Laser Demonstration.
- (U) PE 0305910F, SPACETRACK.
- (U) PE 0603217C, Ballistic Missile Defense, Advanced Development (High Altitude Balloon Experiment).
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

(U) D. Schedule Profile: Not Applicable.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February, 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE									
4 - Demonstration And Validation		0603617F Cmd Control & Comm Applies									
	COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
	Total Program Element (PE) Cost	9,107	5,218	6,437	7,902	8,202	8,550	8,805	9,067	Continuing	TBD
2314	Tactical Air Surveillance	573	935	1,039	1,108	836	482	496	510	Continuing	TBD
2317	Tactical Air Information Production & Distribution	3,541	1,143	1,581	3,912	2,938	3,339	3,439	3,542	Continuing	TBD
2321	Tactical Battle Information Management	4,802	2,901	3,533	2,603	4,055	4,353	4,483	4,616	Continuing	TBD
3804	Tactical Air Forces Systems Integration	191	239	284	279	373	376	387	399	Continuing	TBD

(U) A. Mission Description and Budget Item Justification : Rapidly transitions development in the Science and Technology base to existing C3 programs or directly to warfighting commands. Projects are directly responsive to operational requirements for improved battle management, communications, theater missile defense, and surveillance capability. Takes advantage of advanced technology developments throughout the services and industry as well as off-the-shelf technology. This research is in Category, Demonstration and Validation. Its products are primarily advanced development models, rapid prototype efforts, and software developed through evolutionary acquisition methods. Program also defines system architectures and develops communications technology for modernization and improving the Air Force portion of the Tri-Service communications networks which the Defense Information Systems Agency (DISA) oversees. Beginning in FY 1994, the Tactical Air Information Production and Distribution project has included funding and tasks from PE 0303126F, Long Haul Communications, including the Secure Survivable Communications Network (SSCN).

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)				DATE
BUDGET ACTIVITY		PE NUMBER AND TITLE		
4 - Demonstration And Validation		0603617F Cmd Control & Comm Applies		February, 1995
(U) B. <u>Program Change Summary (\$ in Thousands)</u>				
	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>
(U) Previous President's Budget	9,395	5,402	6,469	7,942
(U) Appropriated Value	9,395			
(U) Adjustments to Appropriated Value	(126)	(93)		
a. General Congressional Deductions	(33)			
b. BTR				
c. SBIR		(91)	(32)	(40)
(U) Adjustments to Budget Years Since FY95 PB				
(U) Current Budget Submit/President's Budget	9,107	5,218	6,437	7,902
				Continuing
				<u>Total Cost</u>
				Continuing
(U) Change Summary Explanation:				
Funding: N/A				
Schedule: N/A				
Technical: N/A				
(U) C. <u>Other Program Funding Summary (\$ in Thousands)</u> See individual projects.				
<u>Related RDT&E:</u> See individual projects.				
(U) D. <u>Schedule Profile</u> See individual projects.				

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February, 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
4 - Demonstration And Validation		0603617F Cmd Control & Comm Applies								2314	
	COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
2314	Tactical Air Surveillance	573	935	1,039	1,108	836	482	496	510	Continuing	TBD
<p>(U) <u>A. Mission Description and Budget Item Justification</u> Develops advanced technology and demonstrates equipment improvements to the Theater Air Control System (TACS) ground surveillance radars. Investigates non-radar and/or adjunct radar sensors to address the Combat Air Forces (CAF) surveillance, detection, and tracking requirements not satisfied by an active radar.</p> <p>(U) <u>FY 1994</u></p> <ul style="list-style-type: none"> (U) Initiated multiple Sidelobe Canceller/Mainlobe Noise Canceller (MSLC/MNC) development/demonstration for AN/TPS-75 radar (\$395). (U) Initiated solid state transmitter panel performance and reliability and maintainability (R&M) testing (\$178). <p>(U) <u>FY 1995</u></p> <ul style="list-style-type: none"> (U) Assess near-term availability of solid state high power devices for the AN/TPS-75 Solid State Transmitter (\$50). (U) Complete MSLC/MNC development (\$560). (U) Complete solid state transmitter panel performance and R&M testing (\$125). (U) Initiate design for distributed tube based transmitter for AN/TPS-75, and build one transmit panel (\$200). <p>(U) <u>FY 1996</u></p> <ul style="list-style-type: none"> (U) Continue development of tube based transmitter panel for AN/TPS-75 (\$900). (U) Develop specification for design/waveform signal processor (\$139). <p>(U) <u>FY 1997</u></p> <ul style="list-style-type: none"> (U) Complete tube based transmitter panel for AN/TPS-75 (\$208). (U) Initiate tube based transmitter panel performance evaluation (\$200). (U) Initiate waveform and signal processor impact evaluation (\$600). (U) Analyze solid state versus tube based transmitter (\$100). 											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

4 - Demonstration And Validation

0603617F Cmd Control & Comm Applics

2314

(U) B. Program Change Summary (\$ in Thousands)

	FY 1994	FY 1995	FY 1996	FY 1997	Total Cost
(U) Previous President's Budget	576	951	1,044	1,114	Continuing
(U) Appropriated Value	576				
(U) Adjustments to Appropriated Value					
a. General Congressional Reductions					
b. SBIR	(3)	(16)			
(U) Adjustments to Budget Years since FY95 PB				(6)	
(U) Current Budget Submit/President's Budget	573	935	1,039	1,108	Continuing

(U) Change Summary Explanation:

Funding: See explanation, page 2

Schedule: Tube Based Development efforts combined into one contractual vehicle; causing contract award delay of 2 quarters.

Technical: N/A

(U) C. Other Program Funding Summary (\$ in Thousands): N/ARelated Activities:

- (U) PE 0602702F, Command, Control, and Communications
- (U) PE 0603789F, C3I Advanced Development
- (U) PE 0207412F, Tactical Air Control System Improvements
- (U) PE 0603260F, Intelligence Advanced Development
- (U) PE 0208010F, Joint Tactical Communications
- (U) PE 0207438F, Theater Battle Management C4I
- (U) There is no unnecessary duplication of effort within the Air Force or the Department of Defense.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)									
BUDGET ACTIVITY					DATE				
4 - Demonstration And Validation					February, 1995				
					PROJECT				
					2314				
					0603617F Cmd Control & Comm Applies				
					PE NUMBER AND TITLE				
(U) D. <u>Schedule Profile</u>									

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

4 - Demonstration And Validation

0603617F Cmd Control & Comm Appls

2317

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
2317 Tactical Air Information Production & Distribution	3,541	1,143	1,581	3,912	2,938	3,339	3,439	3,542	Continuing	TBD

(U) **A. Mission Description and Budget Item Justification:** Transitions advanced communications to the Theater Deployable Communications (TDC) program in support of Theater Battle Management (TBM) command and control enhancements. Capabilities include Multi-Level Security (MLS), survivability, deployability, interoperability, and control for communications networks ranging from base communications to the global Defense Information System Network (DISN). Project includes funding and tasks consolidated from PE 0303126F, Long Haul Communications, beginning in FY94.

(U) FY 1994

- (U) Initiated roadmap to transition networking technologies into AF needs in Theater Deployable Communications (TDC) (\$105).
- (U) Continued development of the Secure Survivable Communications Network (SSCN) (\$1,800).
- (U) Installed SSCN node at Langley AFB and integrate it into a joint demonstration (\$287).
- (U) Continued development of the International Policy Gateway (\$187).
- (U) Completed modeling and simulation for congestion control (\$62).
- (U) Continued cooperative intelligent system for communications management (\$100).
- (U) Completed TBM system integration simulation capability (\$1,000).

(U) FY 1995

- (U) Complete SSCN development and prepare for joint demonstration (\$574).
- (U) Complete cooperative intelligent system for communications management and transition to networking (\$122).
- (U) Initiate SSCN Phase II for fielding and complete transition plan into Theater Deployable Comm Program (\$447).

(U) FY 1996

- (U) Continue SSCN Phase II (\$1,581).

(U) FY 1997

- (U) Complete SSCN Phase II (\$3,394).
- (U) Prepare for joint demonstration (\$518).

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)				DATE	February, 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE		PROJECT	
4 - Demonstration And Validation		0603617F Cmd Control & Comm Applics		2317	
(U) B. Program Change Summary (\$ in Thousands)					
(U) Previous President's Budget	FY 1994	FY 1995	FY 1996	FY 1997	Total Cost
(U) Appropriated Value	4,505	1,174	2,089	4,932	Continuing
(U) Adjustments to Appropriated Value	4,505	1,174			
a. General Congressional Reductions	(62)	(11)			
b. Below Threshold Reprogramming	(902)	(20)			
c. SBIR					
(U) Adjustments to Budget Years Since FY95 PB			(508)	(920)	
(U) Current Budget Submit/President's Budget	3,541	1,143	1,581	3,912	Continuing
(U) Change Summary Explanation:					
Funding: Required adjustments resulting from contractual negotiation and actions.					
Schedule: N/A					
Technical: N/A					
(U) C. Other Program Funding Summary (\$ in Thousands): N/A					
Related Activities: See Project 2314					

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE _____

February, 1995

PROJECT

2317

BUDGET ACTIVITY

4 - Demonstration And Validation

PE NUMBER AND TITLE

0603617F Cmd Control & Comm Applies

(U) **D. Schedule Profile**

(U) Secure Survivable Comm Net Phase 1

Transition Plan

Development

Joint Demo (On-going)

 \mathbf{X}^*

****X****

*X

(U) International Policy Gateway

(U) M&S for Congestion Control

(U) Cooperative Intel System for Mgt

(U) Secure Survivable Comm Net Phase II

Transition Plan

Development

Joint Demo

<u>FY 1994</u>	2	3
----------------	---	---

FY 1995

X**

X**

<u>FY 1996</u>	3
2	

<u>FY 1997</u>	3
2	

4

*
*
X

***X**

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE		February, 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT			
4 - Demonstration And Validation		0603617F Cmd Control & Comm Applies								2321			
COST (In Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost		
2321	Tactical Battle Information Management	4,802	2,901	3,533	2,603	4,055	4,353	4,483	4,616	Continuing	TBD		
<p>(U) A. Mission Description and Budget Item Justification: Field automated decision support systems for the Air Operations Center (AOC). Initial capability was the Advanced Planning System (APS) decision aid. APS supplies combat planners with an automated capability to pull together the information on resources, weapon engineering options, and the current battle situation that will reduce time to generate the Air Tasking Order (ATO) by a factor of ten. Current development focus is the Force Level Execution (FLEX) system in support of the Combat Operations Division of the AOC. FLEX will provide automated execution management and control of operations.</p> <p>(U) <u>FY 1994</u></p> <ul style="list-style-type: none"> (U) Complete verification and validation of APS software (\$188). (U) Initiate development of Force Level Execution (FLEX) automation for the Combat Operations Division of the Air Operations Center (AOC) (\$2,475). (U) Continue Theater Missile Defense prototyping (\$1,945). (U) Initiate Theater Battle Management (TBM) systems integration evaluations (\$194). <p>(U) <u>FY 1995</u></p> <ul style="list-style-type: none"> (U) Continue FLEX development (\$2,444). (U) Transition Theater Missile Defense prototyping (\$0). (U) Continue TBM systems integration evaluations (\$242). (U) Initiate planning for Operations-Intelligence integration development (\$215). <p>(U) <u>FY 1996</u></p> <ul style="list-style-type: none"> (U) Continue FLEX development (\$2,967). (U) Initiate Operations-Intelligence integration development (\$300). (U) Continue TBM systems integration evaluations (\$266). <p>(U) <u>FY 1997</u></p> <ul style="list-style-type: none"> (U) Complete FLEX development and initiate integration into CTAPS (\$256). (U) Continue Operations-Intelligence integration development (\$2,138). (U) Continue TBM systems integration evaluations (\$209). 													

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

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BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

4 - Demonstration And Validation

0603617F Cmd Control & Comm Applics

2321

(U) B. Program Change Summary (\$ in Thousands)

	FY 1994	FY 1995	FY 1996	FY 1997	Total Cost
(U) Previous President's Budget	4,122	2,992	3,051	1,716	Continuing
(U) Appropriated Value	4,122	2,992			
(U) Adjustments to Appropriated Value					
a. Generic Congressional Reductions	(60)	(41)			
b. BTR	869				
c. SBIR	(129)	(50)			
(U) Adjustments to Budget Years Since FY95 PB			482	887	
(U) Current Budget Submit/President's Budget	4,802	2,901	3,533	2,603	Continuing

(U) Change Summary Explanation:

Funding: Required adjustments resulting from final contractual negotiations and adjustments.

Schedule: N/A

Technical: N/A

(U) C. Other Program Funding Summary (\$ in Thousands): N/ARelated Activities: See Project 2314

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)									
BUDGET ACTIVITY							DATE		
4 - Demonstration And Validation							February, 1995		
(U) D. <u>Schedule Profile</u>							PROJECT		
							0603617F Cmd Control & Comm Applies		
							2321		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

4 - Demonstration And Validation

0603617F Cmd Control & Comm Applics

PROJECT

3804

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
3804 Tactical Air Forces Systems Integration	191	239	284	279	373	376	387	399	Continuing	TBD

(U) A. Mission Description and Budget Item Justification: Project provides systems engineering and integration support to the Combat Air Forces (CAF). Project addresses integration and interoperability issues associated with TBM General Officers Steering Group (GOSG) directed efforts, makes recommendations, identifies deficiencies, or establishes requirements for development efforts. No capability is fielded. Project transitions products either to the CAF or to the development efforts.

(U) FY 1994

- (U) Continued analysis of TBM core systems theater integration (\$90).
- (U) Expanded analysis of operations/intelligence interface to include issues of joint operations (\$101).

(U) FY 1995

- (U) Continue support of TBM Core Systems integration (\$120).
- (U) Complete operations/intelligence interface analysis and expand to Defensive Planning functions (\$54).
- (U) Expand TBM force level system prototype evaluations to joint arena (\$65).

(U) FY 1996

- (U) Continue support of TBM core systems integration (\$120).
- (U) Complete analysis of Defensive Planning and expand to Management of Aggregated Sensors (\$64).
- (U) Continue evaluation of Force Level joint interoperability issues (\$100).

(U) FY 1997

- (U) Prepare for AOC Defensive Planning Development (\$119).
- (U) Complete Sensor Management analysis (\$160).

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

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PROJECT

3804

PE NUMBER AND TITLE

0603617F Cmd Control & Comm Applics

BUDGET ACTIVITY

4 - Demonstration And Validation

(U) B. Program Change Summary (\$ in Thousands)

	FY 1994	FY 1995	FY 1996	FY 1997	Total Cost Continuing
(U) Previous President's Budget	192	285	285	280	
(U) Appropriated Value	192	285			
(U) Adjustments to Appropriated Value					
a. General Congressional Reductions	(1)	(41)			
b. SBIR		(5)			
(U) Adjustments to Budget Years Since FY95 PB			(1)	(1)	
(U) Current Budget Submit/President's Budget	191	239	284	279	Continuing

(U) Change Summary Explanation:

Funding: N/A

Schedule: N/A

Technical: N/A

(U) C. Other Program Funding Summary (\$ in Thousands): N/ARelated Activities: See Project 2314

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

4 - Demonstration And Validation

0603617F Cmd Control & Comm Applies

3804

(U) D. Schedule Profile

	FY 1994		FY 1995		FY 1996		FY 1997	
	1	2	3	4	1	2	3	4
(U) Analysis of TBM Core Systems theater integration	X							
(U) Ops-Intel Integration Technology Analysis								
Interfaces	X*			X**				
Joint Operations	X*			X**				
(U) Defensive Planning Analysis Develop Plan					X*			
(U) Sensor Management Analysis Develop Plan							X**	
(U) TBM Force Level System prototype evals								
AOC Combat Operations	X*							
Joint Operations								

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE									
#3, Advanced Development		PE 0603707F, Weather Systems Advanced Development									
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Total PE 0603707F Cost	4,317	4,983	4,577	4,378	4,478	4,577	4,576	4,576	Cont	Cont	
Project 2688, Weather Support Technology	2,577	2,818	2,323	2,209	2,220	2,324	2,499	2,519	Cont	Cont	
Project 2781, Weather Radar Technology	400	400	400	400	400	400	400	400	Cont	Cont	
Project 4026, Centralized Support Technology	1,340	1,765	1,854	1,769	1,858	1,853	1,677	1,657	Cont	Cont	

A. (U) Mission Description and Budget Item Justification: This Advanced Development program demonstrates and transitions new technologies for weather support forces and their operational customers worldwide. Technologies include new data management and forecasting techniques to improve the accuracy and efficiency of weather support to battlefield commanders and peacetime training operations. The program also provides new technologies to improve centralized space/weather support capabilities at the Air Force's Global Weather Central and Space Forecast Center. All efforts in this program element contain the resources necessary, including civilian salaries, to manage, conduct, and document the technical activities.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

#3, Advanced Development PE 0603707F, Weather Systems Advanced Development

B. (U) Program Change Summary (\$ in Thousands):

Previous President's Budget

Appropriated Value

Adjustments to Appropriated Value:

a. Congressional General Reductions

b. SBIR

c. Below Threshold Reprogramming

Current Budget Submit/President's Budget

Change Summary Explanation:

Funding: Not Applicable.

Schedule: Not Applicable.

Technical: Not Applicable.

C. (U) Other Program Funding Summary: Not Applicable.D. (U) Schedule Profile: Not Applicable.Total
Cost
ContFY 1994
4,427
4,452FY 1995
5,100
5,100FY 1996
5,712FY 1997
5,896

Cont

4,577

4,983

4,317

Current Budget Submit/President's Budget

Change Summary Explanation:

Funding: Not Applicable.

Schedule: Not Applicable.

Technical: Not Applicable.

C. (U) Other Program Funding Summary: Not Applicable.D. (U) Schedule Profile: Not Applicable.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.			
#3, Advanced Development		PE 0603707F, Weather Systems Advanced Development 2688											
COST (\$ in Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost		
Project 2688, Weather Support Technology		2,577	2,818	2,323	2,209	2,220	2,324	2,499	2,519	Cont	Cont		
<p>A. (U) <u>Mission Description and Budget Item Justification</u>: This project improves the Air Force's ability to gather, integrate, and forecast target weather information in data-denied battle areas. This is accomplished through the demonstration of tactical automated weather observations sensors, techniques to fuse weather data from different sources and times into a single "best available" analysis, and weather forecast models to address various levels of in-theater availability.</p> <p>(U) <u>FY 1994</u>:</p> <ul style="list-style-type: none"> - (U) Developed target scenes for the advanced electro-optical (EO) weather impact decision aid. (\$700K) - (U) Demonstrated battlefield utility of the tactical weather observation sensors. (\$280K) - (U) Developed a first-in, limited data battlefield weather forecast model. (\$200K) - (U) Developed Tactical Forecast System (TFS) analysis and forecast models. (\$550K) - (U) Delivered Night Vision Goggle (NVG) Air Refueling Decision Aid (ARDA). (\$697K) - (U) Developed new Base Weather Station (BWS) technologies. (\$150K) <p>(U) <u>FY 1995</u>:</p> <ul style="list-style-type: none"> - (U) Develop new capability for integrating all available in-theater weather observations into automated weather analyses. (\$200K) - (U) Complete/deliver weather impact decision aid for NVGs. (\$180K) - (U) Complete/deliver the first-in battlefield weather forecast model. (\$200K) - (U) Demonstrate weather impact decision aids on mission planning systems. (\$683K) - (U) Continue development of TFS analysis and forecast models. (\$700K) - (U) Develop NVG Operations Weather Software (NOWS) decision aids. (\$235K) - (U) Evaluate new TFS weather observation sensors; complete development of new BWS technologies. (\$620K) 													

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE February 1994
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.
#3, Advanced Development	PE 0603707F, Weather Systems Advanced Development 2688	
<p>(U) <u>FY 1996:</u></p> <ul style="list-style-type: none"> - (U) Tactical Weather Technology. (\$633K) - (U) Continue development of Tactical Forecast System (TFS) observations, analysis, and forecast technology. - (U) Weather Impact Decision Aids (WIDA). (\$1,690K) - (U) Develop electro-optical weather impact modules for automated mission planning. - (U) Incorporate new operational command mission scenarios into Night Vision Goggles (NVG) Operations Weather Software (NOWS). - (U) Complete evaluation of target/background weather sensitivity for infrared sensors. <p>(U) <u>FY 1997:</u></p> <ul style="list-style-type: none"> - (U) Tactical Weather Technology. (\$630K) - (U) Complete capability for automating integration of theater weather observations. - (U) Continue Tactical Forecast System (TFS) technology development. - (U) Weather Impact Decision Aids (WIDA). (\$1,579K) - (U) Develop scene simulation capability for infrared sensor and NVG weather impact decision aids. - (U) Develop new target acquisition software and mission impact modules for weather decision aid models. 		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE																		
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.																		
#3, Advanced Development	PE 0603707F, Weather Systems Advanced Development 2688																			
<p>B. (U) <u>Program Change Summary (\$ in Thousands):</u></p> <table border="0"> <thead> <tr> <th></th> <th>FY 1994</th> <th>FY 1995</th> <th>FY 1996</th> <th>FY 1997</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Previous President's Budget</td> <td>2,687</td> <td>2,935</td> <td>3,242</td> <td>3,391</td> <td>Cost</td> </tr> <tr> <td>Current Budget Submit/President's Budget</td> <td>2,577</td> <td>2,818</td> <td>2,323</td> <td>2,209</td> <td>Cont</td> </tr> </tbody> </table> <p>Change Summary Explanation:</p> <p>Funding: Not Applicable.</p> <p>Schedule: Not Applicable.</p> <p>Technical: Not Applicable.</p> <p>C. (U) <u>Other Program Funding Summary:</u></p> <p>(U) <u>Related Activities:</u></p> <ul style="list-style-type: none"> - (U) PE 0305160F, Defense Meteorological Satellite Program. - (U) PE 0602601, Phillips Laboratory. - (U) PE 0305111F, Weather Service. - (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication. <p>D. (U) <u>Schedule Profile:</u> Not Applicable.</p>				FY 1994	FY 1995	FY 1996	FY 1997	Total	Previous President's Budget	2,687	2,935	3,242	3,391	Cost	Current Budget Submit/President's Budget	2,577	2,818	2,323	2,209	Cont
	FY 1994	FY 1995	FY 1996	FY 1997	Total															
Previous President's Budget	2,687	2,935	3,242	3,391	Cost															
Current Budget Submit/President's Budget	2,577	2,818	2,323	2,209	Cont															

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.			
#3, Advanced Development		PE 0603707F, Weather Systems Advanced Development 2781											
COST (\$ in Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost		
Project 2781, Weather Radar Technology		400	400	400	400	400	400	400	400	Cont	Cont		
<p>A. (U) <u>Mission Description and Budget Item Justification:</u> This project develops new technologies to fully exploit the capabilities of new operational DOD doppler weather radars. These technologies will be used by the Air Force to better observe and forecast severe weather such as wind shear, tornadoes, and hail.</p> <p>(U) <u>FY 1994:</u></p> <ul style="list-style-type: none"> - (U) Completed a technique to locate weather fronts. (\$125K) - (U) Developed a technique to correlate severe weather and observed wind fields. (\$150K) - (U) Developed new severe weather identification techniques. (\$125K) <p>(U) <u>FY 1995:</u></p> <ul style="list-style-type: none"> - (U) Develop/evaluate a new algorithm for tornado and hail detection. (\$150K) - (U) Evaluate relationship between precipitation structures and severe weather. (\$125K) - (U) Evaluate new severe weather quantification algorithm. (\$125K) <p>(U) <u>FY 1996:</u></p> <ul style="list-style-type: none"> - (U) Severe weather prediction software. (\$400K) - (U) Complete a storm structure algorithm to predict severe weather. - (U) Complete an algorithm to determine location/intensity of weather fronts. - (U) Continue development of lightning algorithms. <p>(U) <u>FY 1997:</u></p> <ul style="list-style-type: none"> - (U) Severe weather prediction software. (\$400K) - (U) Continue development of hail identification algorithms. - (U) Begin development of advanced tropical cyclone algorithms. - (U) Develop three-dimensional storm structure algorithms. 													

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	PROJECT NO.																		
BUDGET ACTIVITY	PE NUMBER AND TITLE																				
#3, Advanced Development	PE 0603707F, Weather Systems Advanced Development 2781																				
<p>B. (U) <u>Program Change Summary (\$ in Thousands):</u></p> <table border="0"> <thead> <tr> <th></th> <th>FY 1994</th> <th>FY 1995</th> <th>FY 1996</th> <th>FY 1997</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Previous President's Budget</td> <td>400</td> <td>400</td> <td>400</td> <td>400</td> <td>Cost</td> </tr> <tr> <td>Current Budget Submit/President's Budget</td> <td>400</td> <td>400</td> <td>400</td> <td>400</td> <td>Cont</td> </tr> </tbody> </table>					FY 1994	FY 1995	FY 1996	FY 1997	Total	Previous President's Budget	400	400	400	400	Cost	Current Budget Submit/President's Budget	400	400	400	400	Cont
	FY 1994	FY 1995	FY 1996	FY 1997	Total																
Previous President's Budget	400	400	400	400	Cost																
Current Budget Submit/President's Budget	400	400	400	400	Cont																
<p>Change Summary Explanation:</p> <p>Funding: Not Applicable.</p> <p>Schedule: Not Applicable.</p> <p>Technical: Not Applicable.</p>																					
<p>C. (U) <u>Other Program Funding Summary:</u></p> <p>(U) <u>Related Activities:</u></p> <ul style="list-style-type: none"> - (U) PE 0602601, Phillips Laboratory. - (U) PE 0305111F, Weather Service. - (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication. 																					
<p>D. (U) <u>Schedule Profile:</u> Not Applicable.</p>																					

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.			
#3, Advanced Development		PE 0603707F, Weather Systems Advanced Development 4026											
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost			
Project 4026, Centralized Support Technology	1,340	1,765	1,854	1,769	1,858	1,853	1,677	1,657	Cont	Cont			
<p>A. (U) <u>Mission Description and Budget Item Justification:</u> This project develops technologies for space forecasting models for the earth's neutral atmosphere, ionosphere, and magnetosphere needed to provide critical support to Air Force surveillance, communications, and other satellite assets. This project also develops new global and theater weather forecast techniques to improve the Air Force's capability to provide centralized weather support to fixed-site and deployed weather forces worldwide.</p> <p>(U) <u>FY 1994:</u></p> <ul style="list-style-type: none"> - (U) Completed an enhanced global cloud prediction model. (\$150K) - (U) Delivered a neutral atmosphere model used for satellite orbital predictions. (\$150K) - (U) Completed a magnetospheric model for predicting satellite anomalies. (\$150K) - (U) Developed a model for predicting space upsets of microelectronics devices. (\$150K) - (U) Developed a neutral atmosphere/space specification and forecast model for the Air Force Space Forecast Center (AFSPC). (\$590K) - (U) Developed a global aviation weather hazard prediction model. (\$150K) <p>(U) <u>FY 1995:</u></p> <ul style="list-style-type: none"> - (U) Deliver a validated ionospheric model for understanding and forecasting communication systems outages. (\$300K) - (U) Deliver a global ionospheric forecast model for space track and communication predictions. (\$200K) - (U) Develop a model for coupling the ionosphere and neutral atmosphere. (\$325K) - (U) Continue development of a neutral atmosphere/space specification and forecast model for the AFSPC. (\$625K) - (U) Continue development of global aviation and battlefield weather hazard prediction models. (\$315K) 													

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.
#3, Advanced Development	PE 0603707F, Weather Systems Advanced Development 4026	
<p>(U) <u>FY 1996:</u></p> <ul style="list-style-type: none"> - (U) Centralized weather support technology. (\$791K) - (U) Deliver initial cloud layer and surface visibility diagnostic models. - (U) Continue development of aviation hazard diagnostic models. - (U) Space weather models. (\$1,063K) - (U) Continue development of advanced space weather models. - (U) Continue development of executive model to integrate space weather models. <p>(U) <u>FY 1997:</u></p> <ul style="list-style-type: none"> - (U) Centralized weather support technology. (\$728K) - (U) Deliver final cloud layer and surface visibility diagnostic models. - (U) Deliver initial aviation weather hazard diagnostic models. - (U) Space weather models. (\$1,041K) - (U) Deliver integrated space environmental model to link all space weather models. - (U) Begin development of a new coupled space model for space weather hazards. - (U) Continue development of advanced space weather forecast models. 		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	PROJECT NO.																		
BUDGET ACTIVITY		PE NUMBER AND TITLE																			
#3, Advanced Development		PE 0603707F, Weather Systems Advanced Development 4026																			
<p>B. (U) <u>Program Change Summary (\$ in Thousands):</u></p> <table border="0"> <thead> <tr> <th></th> <th>FY 1994</th> <th>FY 1995</th> <th>FY 1996</th> <th>FY 1997</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Previous President's Budget</td> <td>1,340</td> <td>1,765</td> <td>2,070</td> <td>2,105</td> <td>Cost</td> </tr> <tr> <td>Current Budget Submit/President's Budget</td> <td>1,340</td> <td>1,765</td> <td>1,854</td> <td>1,769</td> <td>Cont</td> </tr> </tbody> </table> <p>Change Summary Explanation:</p> <p>Funding: Not Applicable.</p> <p>Schedule: Not Applicable.</p> <p>Technical: Not Applicable.</p>					FY 1994	FY 1995	FY 1996	FY 1997	Total	Previous President's Budget	1,340	1,765	2,070	2,105	Cost	Current Budget Submit/President's Budget	1,340	1,765	1,854	1,769	Cont
	FY 1994	FY 1995	FY 1996	FY 1997	Total																
Previous President's Budget	1,340	1,765	2,070	2,105	Cost																
Current Budget Submit/President's Budget	1,340	1,765	1,854	1,769	Cont																
<p>C. (U) <u>Other Program Funding Summary:</u></p> <p>(U) <u>Related Activities:</u></p> <ul style="list-style-type: none"> - (U) PE 0305160F, Defense Meteorological Satellite Program. - (U) PE 0602601, Phillips Laboratory. - (U) PE 0305111F, Weather Service. - (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication. 																					
<p>D. (U) <u>Schedule Profile:</u> Not Applicable.</p>																					

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY										PE NUMBER AND TITLE			
#3, Advanced Development										PE 0603723F, Civil and Environmental Engineering Technology			
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost			
Total PE 0603723F Cost	12,906	9,678	9,835	9,713	11,376	11,592	12,814	14,644	Cont	Cont			
Project 2103, Environmental Quality Advanced Technology	7,839	5,224	8,469	8,463	10,201	10,442	11,564	13,494	Cont	Cont			
Project 2104, Air Base Operability Advanced Technology	3,820	2,941	-0-	-0-	-0-	-0-	-0-	-0-	Cont	Cont			
Project 3037, Noise and Sonic Boom Impact Technology	1,247	1,513	1,366	1,250	1,175	1,150	1,250	1,150	Cont	Cont			
Note: Beginning in FY 1996, Project 2104 from this PE will be transferred to Wright Laboratory's PE 0603205F, Aerospace Vehicle Technology.													
A. (U) Mission Description and Budget Item Justification: This Advanced Development program develops and demonstrates advanced technologies to address Air Force-unique environmental problems and determine the effect of aircraft noise and sonic boom stimuli on humans, animals, and structures. Specific projects advance and integrate environmental issues and operating concerns into air base design, support, and maintenance. All efforts in this program element contain the resources necessary, including civilian salaries, to manage, conduct, and document the technical activities.													

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY		DATE		February 1995	
PE NUMBER AND TITLE		PE 0603723F, Civil and Environmental Engineering Technology			
<p>#3, Advanced Development</p>					
<p>B. (U) <u>Program Change Summary (\$ in Thousands):</u></p>					
Previous President's Budget	FY 1994	FY 1995	FY 1996	FY 1997	Total
Appropriated Value	13,360	9,798	10,290	11,772	Cost
Adjustments to Appropriated Value	13,435	9,798			Cont
a. Congressional General Reductions	-75				
b. SBIR	-154				
c. Omnibus Reprogramming	-300				
Current President's Budget	12,906	9,678	9,835	9,713	Cont
<p>Change Summary Explanation:</p>					
<p>Funding: Not Applicable.</p>					
<p>Schedule: Not Applicable.</p>					
<p>Technical: Not Applicable.</p>					
<p>C. (U) <u>Other Program Funding Summary:</u> Not Applicable.</p>					
<p>D. (U) <u>Schedule Profile:</u> Not Applicable.</p>					

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.			
#3, Advanced Development		PE 0603723F, Civil and Environmental Engineering Technology								2103			
COST (\$ in Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost		
Project 2103, Environmental Quality Advanced Technology		7,839	5,224	8,469	8,463	10,201	10,442	11,564	13,494	Cont	Cont		
<p>A. (U) <u>Mission Description and Budget Item Justification:</u> This project develops and demonstrates advanced technologies to solve environmental restoration problems, reduce hazardous emissions from weapon systems, minimize Air Force industrial waste, and eliminate toxic pollutant releases from Air Force operations.</p> <p>(U) FY 1994:</p> <ul style="list-style-type: none"> - (U) Developed technologies and design criteria for improved monitoring, disposal characterization, and remediation techniques for contaminated Air Force sites. (\$461K) -- (U) Developed bioremediation technologies to clean up Air Force sites contaminated with fuels and solvents, including demonstrating the use of nitrate to enhance in situ anaerobic biodegradation. - (U) Developed technologies to predict and reduce contamination in the environment by Air Force materials and operations. (\$7,378K) -- (U) Developed innovative technologies to treat/recycle hazardous wastes from Air Force industrial operations to reduce disposal costs and comply with regulatory limits, including a multi-metals recovery/recycle treatment system, techniques for propellant biodegradation, and methods for removing contaminants from plating baths,. -- (U) Developed spray casting as an alternative to cadmium electroplating. -- (U) Developed affordable technologies to control air pollutant emissions from Air Force industrial processes to comply with Clean Air Act Amendments (CAAA), including an integrated emissions dispersion database, and expert decision technology to aid environmental planners and air pollution managers. -- (U) Determined the atmospheric chemistry of candidate and new Air Force fuels and chemicals; demonstrated an advanced monitoring capability to detect hazardous air pollutants at the part-per-billion (PPB) level. 													

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#3, Advanced Development	PE 0603723F, Civil and Environmental Engineering Technology	2103	
<p>(U) FY 1995:</p> <ul style="list-style-type: none"> - (U) Continue to develop and demonstrate technologies and design criteria for improved monitoring, disposal characterization, and remediation techniques for contaminated Air Force sites. (\$2,083K) -- (U) Conduct validation of surfactants to contain a dissolved solvent plume combined with in-place biodegradation to destroy the contaminant; continue to develop and demonstrate in-place physical/chemical technologies to contain and treat dense, nonaqueous phase liquids and other contaminants. -- (U) Develop application of bioventing to non-petroleum compounds and in-place remediation of solvents including Perchloroethylene (PCE) and Trichloroethylene (TCE) in saturated soils; continue to develop and demonstrate in-place bioremediation technologies to clean up Air Force sites contaminated with fuels and solvents. -- (U) Conduct field monitoring of parameters supporting bioremediation of fuels and solvents, and validating an in-place real-time laser spectrometer/fiber optic system; continue to develop in-place sensors and monitoring technologies to locate, identify, and monitor contaminant sources, plumes, and remediation activities. - (U) Continue to develop and demonstrate technologies to predict and reduce contamination of the environment by Air Force materials and operations. (\$3,141K) -- (U) Complete verifications of solid rocket propellant biodegradation technologies to assist in disposal of large rocket motors; continue to develop and demonstrate innovative technologies to treat/recycle hazardous wastes from Air Force industrial operations to reduce disposal costs and comply with regulatory limits. -- (U) Determine the atmospheric chemistry of candidate and new Air Force fuels and chemicals; develop advanced monitoring technology for hazardous air pollutants; and conduct atmospheric investigation to enhance risk assessment and model verification for Air Force space launch operations. -- (U) Conduct verification of a low-back-pressure, Nitrous Oxide (NOx) control technology for jet engine test cells based on cold-plasma-induced chemical processes; continue to develop and demonstrate affordable technologies to control air pollutant emissions from Air Force industrial processes to comply with Clean Air Act Amendments (CAAA). 			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#3, Advanced Development	PE 0603723F, Civil and Environmental Engineering Technology	2103	
<p>(U) FY 1996:</p> <ul style="list-style-type: none"> - (U) Continue to develop and demonstrate technologies and design criteria for improved monitoring, disposal characterization, and remediation techniques for contaminated Air Force sites. (\$3,388K) -- (U) Complete demonstration of bioventing for non-petroleum compounds; continue to develop and demonstrate in-place bioremediation technologies to clean up Air Force sites contaminated with fuels and solvents, including in-place remediation of solvents such as Perchloroethylene (PCE) and Trichloroethylene (TCE) in saturated soils. -- (U) Complete demonstration of a real time in-place laser spectrometer/fiber optic monitoring process; continue to develop and demonstrate in-place sensors and monitoring technologies to locate, identify, and monitor contaminant sources, plumes, and remediation activities. -- (U) Apply natural attenuation findings to provide a scientific foundation for regulatory acceptance; continue to determine and validate the fate and transport characteristics of contaminants in soils and groundwater to enhance and validate models for development of remediation technologies and plans. - (U) Continue to develop and demonstrate technologies to predict and reduce contamination of the environment by Air Force materials and operations. (\$5,081K) -- (U) Determine the atmospheric chemistry of candidate and new Air Force fuels and chemicals; develop advanced air monitoring technology. -- (U) Characterize catastrophic space launch aborts and atmospheric diffusion to validate space launch toxic risk assessment models; begin characterization of JP-8 fuel emissions. -- (U) Evaluate a recirculating paint booth to control Volatile Organic Compounds (VOC) emissions; continue to develop and demonstrate affordable technologies to control air pollutant emissions from Air Force industrial processes to comply with Clean Air Act Amendments. -- (U) Conduct a technology demonstration to recycle hydraulic fluids, reducing hazardous waste and procurement and disposal costs; continue to develop cost-effective alternate processes and materials that reduce or eliminate the production of hazardous wastes and the use of hazardous materials. 			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#3, Advanced Development	PE 0603723F, Civil and Environmental Engineering Technology	2103	
<p>(U) <u>FY 1997:</u></p> <ul style="list-style-type: none"> - (U) Continue to develop and demonstrate technologies and design criteria for improved monitoring, characterization, and remediation techniques for contaminated Air Force sites. (\$3,392K) -- (U) Complete validation of surfactants to contain a dissolved plume combined with in-place biodegradation to destroy the contaminant; continue to develop and demonstrate in-place physical/chemical technologies to contain and treat dense nonaqueous phase liquids (DNAPLs) and other contaminants. -- (U) Complete demonstration of a method to direct site characterization by real-time data analysis and visualization; continue to develop and demonstrate in-place sensors and monitoring technologies to locate, identify, and monitor contaminant sources, plumes, and remediation activities. -- (U) Demonstrate an enhanced model to accurately predict plume migration in a heterogeneous aquifer; continue to determine and validate the fate and transport characteristics of contaminants in soils and groundwater. - (U) Continue to develop and demonstrate technologies to predict and reduce contamination of the environment by Air Force materials and operations. (\$5,071K) -- (U) Demonstrate an advanced air monitoring technology; continue to characterize catastrophic space launch aborts and atmospheric diffusion to validate space launch toxic risk assessment models; and determine the atmospheric chemistry of candidate and new Air Force fuels and chemicals. -- (U) Demonstrating cost-effective Nitrous Oxide (NOx) emission control for Aerospace Ground Equipment (AGE); continue to develop and demonstrate affordable technologies to control air pollutant emissions from Air Force industrial processes to comply with the Clean Air Act Amendments. -- (U) Develop an advanced chemical reactor to treat/recycle hazardous/energetic materials and the coupling of multiple technologies to treat complex chemical wastes; continue to develop and demonstrate innovative technologies to treat/recycle hazardous wastes. 			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995																		
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.																			
#3, Advanced Development	PE 0603723F, Civil and Environmental Engineering Technology	2103																			
<p>B. (U) <u>Program Change Summary (\$ in Thousands):</u></p> <table border="0"> <thead> <tr> <th></th> <th>FY 1994</th> <th>FY 1995</th> <th>FY 1996</th> <th>FY 1997</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Previous President's Budget</td> <td>8,039</td> <td>5,448</td> <td>5,693</td> <td>6,583</td> <td>Cost</td> </tr> <tr> <td>Current President's Budget</td> <td>7,839</td> <td>5,224</td> <td>8,469</td> <td>8,463</td> <td>Cont</td> </tr> </tbody> </table> <p>Change Summary Explanation:</p> <p>Funding: Increase due to increased emphasis on pollution prevention and environmental restoration.</p> <p>Schedule: Not Applicable.</p> <p>Technical: Not Applicable.</p> <p>C. (U) <u>Other Program Funding Summary:</u></p> <p>(U) <u>Related Activities:</u></p> <ul style="list-style-type: none"> - (U) PE 0602102F, Materials. - (U) PE 0602202F, Human Systems Technology. - (U) PE 0602203F, Aerospace Propulsion. - (U) PE 0603211F, Aerospace Structures. - (U) PE 0603231F, Crew Systems and Personnel Protection Technology. - (U) PE 0603716D, Strategic Environmental Research and Development Program. - (U) PE 0604706F, Life Support Systems. - (U) PE 0604708F, Other Operational Equipment. - (U) PE 0708011F, Industrial Base Program. - (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication. <p>D. (U) <u>Schedule Profile:</u> Not Applicable.</p>					FY 1994	FY 1995	FY 1996	FY 1997	Total	Previous President's Budget	8,039	5,448	5,693	6,583	Cost	Current President's Budget	7,839	5,224	8,469	8,463	Cont
	FY 1994	FY 1995	FY 1996	FY 1997	Total																
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Current President's Budget	7,839	5,224	8,469	8,463	Cont																

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE										February 1995	
PE NUMBER AND TITLE										PROJECT NO.	
#3, Advanced Development										2104	
PE 0603723F, Civil and Environmental Engineering Technology											
BUDGET ACTIVITY	COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Project 2104, Air Base Operability Advanced Technology		3,820	2,941	-0-	-0-	-0-	-0-	-0-	-0-	Cont	Cont
<p>A. (U) <u>Mission Description and Budget Item Justification</u>: This project develops and demonstrates advanced technologies to build air base facilities and utilities that can survive chemical, biological, and conventional weapons attack. It also develops advanced technologies to: construct and repair runways and air mobile structures; perform damage assessment and repair; perform crash rescue; suppression of aircraft and air base post-attack fires; and perform critical peacetime civil engineering construction, maintenance, and repair.</p> <p>(U) <u>FY 1994</u>:</p> <ul style="list-style-type: none"> - (U) Demonstrated technologies and design criteria for improved bare-base/fixed-site applications (e.g., power and environmental utilities, survivable air base structures, and durable/repairable airfield surfaces). (\$2,762K) - (U) Demonstrated advanced aircraft/air base fire fighting technologies (e.g., clean, environmentally-safe fire fighting agents, vehicles, equipment, personnel protective clothing, fire risk assessment techniques, and fire fighter training). (\$1,058K) <p>(U) <u>FY 1995</u>:</p> <ul style="list-style-type: none"> - (U) Continue to demonstrate technologies and design criteria for improved bare-base/fixed-site applications (e.g., power and environmental utilities, survivable air base structures, and durable/repairable airfield surfaces). (\$2,210K) - (U) Continue to demonstrate advanced aircraft/air base fire fighting technologies (e.g., clean, environmentally-safe fire fighting agents, vehicles, equipment, personnel protective clothing, fire risk assessment techniques, and fire fighter training). (\$731K) <p>(U) <u>FY 1996</u>: Not Applicable.</p> <p>(U) <u>FY 1997</u>: Not Applicable.</p>											

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995																		
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.																			
#3, Advanced Development	PE 0603723F, Civil and Environmental Engineering Technology	2104																			
<p>B. (U) <u>Program Change Summary (\$ in Thousands):</u></p> <table border="0"> <thead> <tr> <th></th> <th>FY 1994</th> <th>FY 1995</th> <th>FY 1996</th> <th>FY 1997</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Previous President's Budget</td> <td>4,028</td> <td>3,050</td> <td>3,231</td> <td>3,794</td> <td>Cost</td> </tr> <tr> <td>Current President's Budget</td> <td>3,820</td> <td>2,941</td> <td>-0-</td> <td>-0-</td> <td>Cont</td> </tr> </tbody> </table> <p>Change Summary Explanation:</p> <p>Funding: Beginning in FY 1996, this project will be transferred to Wright Laboratory's PE 0603205F, Aerospace Vehicle Technology.</p> <p>Schedule: Not Applicable.</p> <p>Technical: Not Applicable.</p> <p>C. (U) <u>Other Program Funding Summary:</u></p> <p>(U) <u>Related Activities:</u></p> <ul style="list-style-type: none"> - (U) PE 0602102F, Materials. - (U) PE 0602202F, Human Systems Technology. - (U) PE 0603231F, Crew Systems and Personnel Protection Technology. - (U) PE 0603307F, Air Base Operability Advanced Development. - (U) PE 0604617F, Air Base Operability. - (U) PE 0604703F, Aeromedical/Chemical Defense Systems Development. - (U) PE 0604708F, Other Operational Equipment. - (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication. <p>D. (U) <u>Schedule Profile:</u> Not Applicable.</p>					FY 1994	FY 1995	FY 1996	FY 1997	Total	Previous President's Budget	4,028	3,050	3,231	3,794	Cost	Current President's Budget	3,820	2,941	-0-	-0-	Cont
	FY 1994	FY 1995	FY 1996	FY 1997	Total																
Previous President's Budget	4,028	3,050	3,231	3,794	Cost																
Current President's Budget	3,820	2,941	-0-	-0-	Cont																

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY		DATE								PROJECT NO.	
		PE NUMBER AND TITLE									
#3, Advanced Development		PE 0603723F, Civil and Environmental Engineering Technology								3037	
COST (\$ In Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Project 3037, Noise and Sonic Boom Technology		1,247	1,513	1,366	1,250	1,175	1,150	1,250	1,150	Cont	Cont
<p>A. (U) Mission Description and Budget Item Justification: This project develops and demonstrates technologies to predict and evaluate the environmental impacts of noise from aircraft operations, as directed by the National Environmental Policy Act. Improving this capability is essential for timely response to public concerns, preparation of accurate environmental impact statements, and minimizing unfavorable legal challenges to Air Force operations.</p> <p>(U) FY 1994:</p> <ul style="list-style-type: none"> - (U) Demonstrated noise effects technologies. (\$1,247K) -- (U) Completed documentation and made version 1.0 of the Assessment System for Aircraft Noise (ASAN) available for transition. -- (U) Developed and demonstrated technologies and procedures to measure and assess the effects of aircraft noise on humans, animals, and structures. -- (U) Developed and demonstrated technologies for active noise control to include jet engine test facilities, ear plugs, and portable sources. <p>(U) FY 1995:</p> <ul style="list-style-type: none"> - (U) Demonstrate noise effects technology. (\$1,513K) -- (U) Complete documentation and make version 2.0 of ASAN available for transition. -- (U) Verify and continue to evaluate technologies and procedures assessing the effects of aircraft noise on humans, animals, and structures. <p>(U) FY 1996:</p> <ul style="list-style-type: none"> - (U) Demonstrate noise effects technology. (\$1,366K) -- (U) Complete release of version 2.0 of ASAN and continue development of advanced models for integration into ASAN. -- (U) Continue to refine technologies and procedures to measure the effects of aircraft noise on humans, animals, and structures. 											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995																		
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.																			
#3, Advanced Development	PE 0603723F, Civil and Environmental Engineering Technology	3037																			
<p>(U) <u>FY 1997:</u></p> <ul style="list-style-type: none"> - (U) Demonstrate noise effects technology. (\$1,250K) -- (U) Complete advanced releases of Assessment System for Aircraft Noise (ASAN); continue development of advanced models for integration into ASAN. -- (U) Continue to demonstrate improvements in assessing the effects of aircraft noise on humans, animals, and structures. 																					
<p>B. (U) <u>Program Change Summary (\$ in Thousands):</u></p> <table border="0"> <thead> <tr> <th></th> <th><u>FY 1994</u></th> <th><u>FY 1995</u></th> <th><u>FY 1996</u></th> <th><u>FY 1997</u></th> <th><u>Total</u></th> </tr> </thead> <tbody> <tr> <td>Previous President's Budget</td> <td>1,293</td> <td>1,300</td> <td>1,366</td> <td>1,395</td> <td>Cost</td> </tr> <tr> <td>Current President's Budget</td> <td>1,247</td> <td>1,513</td> <td>1,366</td> <td>1,250</td> <td>Cont</td> </tr> </tbody> </table>					<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>	<u>Total</u>	Previous President's Budget	1,293	1,300	1,366	1,395	Cost	Current President's Budget	1,247	1,513	1,366	1,250	Cont
	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>	<u>Total</u>																
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<p>Change Summary Explanation:</p> <p>Funding: Not Applicable.</p> <p>Schedule: Not Applicable.</p> <p>Technical: Not Applicable.</p>																					
<p>C. (U) <u>Other Program Funding Summary:</u></p> <p>(U) <u>Related Activities:</u></p> <ul style="list-style-type: none"> - (U) PE 0602202F, Human Systems Technology. - (U) PE 0602203F, Aerospace Propulsion. - (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication. 																					
<p>D. (U) <u>Schedule Profile:</u> Not Applicable.</p>																					

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY										PE NUMBER AND TITLE	
#3, Advanced Development										PE 0603726F, Command, Control, and Communications (C3)	
										Subsystems Integration	
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Total PE 0603726F Cost	8,547	10,814	12,008	10,971	12,950	14,411	14,930	15,465	Cont	Cont	
Project 2810, Advanced Image/Information Applications	2,400	3,215	4,015	4,375	4,988	5,445	5,625	5,830	Cont	Cont	
Project 2863, Integrated Photonics	4,014	4,179	4,320	2,870	3,222	3,724	3,799	3,933	Cont	Cont	
Project 3192, Advanced Optical Memory Technology	2,133	3,420	3,673	3,726	4,740	5,242	5,506	5,702	Cont	Cont	
<p>A. (U) <u>Mission Description and Budget Item Justification:</u> This Advanced Development program develops and demonstrates C3 technologies in the areas of spatial data manipulation of digital databases, photonics technology, optical disk storage/processing of digital information, and distributed processing technology for interoperability between dispersed command centers. These technologies provide increased storage, processing, and transmission of digital data that contains unlimited data content. All efforts in this program element contain the resources necessary, including civilian salaries, to manage, conduct, and document the technical activities.</p>											

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE																																																						
BUDGET ACTIVITY	PE NUMBER AND TITLE																																																							
#3, Advanced Development	PE 0603726F, Command, Control, and Communications (C3) Subsystems Integration	February 1995																																																						
<p>B. (U) <u>Program Change Summary (\$ in Thousands):</u></p> <table border="0"> <thead> <tr> <th></th> <th>FY 1994</th> <th>FY 1995</th> <th>FY 1996</th> <th>FY 1997</th> <th>Total Cost Cont</th> </tr> </thead> <tbody> <tr> <td>Previous President's Budget</td> <td>8,617</td> <td>11,050</td> <td>15,568</td> <td>18,531</td> <td></td> </tr> <tr> <td>Appropriated Value</td> <td>8,882</td> <td>11,050</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Adjustments to Appropriated Value:</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>a. Congressional General Reductions</td> <td>-265</td> <td>-236</td> <td></td> <td></td> <td></td> </tr> <tr> <td>b. SBIR</td> <td>-120</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>c. Omnibus Reprogramming</td> <td>-442</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>d. Below Threshold Reprogramming</td> <td>492</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Current President's Budget</td> <td>8,547</td> <td>10,814</td> <td>12,008</td> <td>10,971</td> <td>Cont</td> </tr> </tbody> </table> <p>Change Summary Explanation:</p> <p>Funding: Increases from FY 1995 to FY 1996 are to address C3 technology deficiencies identified by the user. This technology directly supports the Joint Chiefs of Staff Future Joint Warfighting Capability: "To maintain near perfect real-time knowledge of the enemy and communicate that to all forces in near-real-time."</p> <p>Schedule: Not Applicable.</p> <p>Technical: Not Applicable.</p> <p>C. (U) <u>Other Program Funding Summary:</u> Not Applicable</p> <p>D. (U) <u>Schedule Profile:</u> Not Applicable.</p>				FY 1994	FY 1995	FY 1996	FY 1997	Total Cost Cont	Previous President's Budget	8,617	11,050	15,568	18,531		Appropriated Value	8,882	11,050				Adjustments to Appropriated Value:						a. Congressional General Reductions	-265	-236				b. SBIR	-120					c. Omnibus Reprogramming	-442					d. Below Threshold Reprogramming	492					Current President's Budget	8,547	10,814	12,008	10,971	Cont
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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

#3, Advanced Development

PE 0603726F, Command, Control, and Communications (C3)
Subsystems Integration
2810

COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Project 2810, Advanced Image/Information Applications	2,400	3,215	4,015	4,375	4,988	5,445	5,625	5,830	Cont	Cont

A. (U) Mission Description and Budget Item Justification: This project develops and demonstrates techniques and algorithms to meet weapon systems requirements for digital image and spatial data required for mission planning, navigation, targeting, and terrain analysis. This project provides generic interrogation techniques, as well as standard applications algorithms for Air Force exploitation of digitally processed image and spatial database products. Additionally, it develops an automated capability to reference and display hypermedia communications.

(U) FY 1994:

- (U) Developed and demonstrated advanced imagery and information technologies to enhance warfighter mission planning, navigation, targeting, and terrain analysis. (\$1,500K)
- (U) Delivered to the warfighter the Air Force Geographic Information Handling System which provides a common, unified map server in accordance with Defense Mapping Agency standards, replacing user-specific systems.
- (U) Developed and demonstrated automated capabilities to display hypermedia communications which fully exploit the data available to the field commander in a timely manner. (\$500K)
- (U) Developed hypermedia core algorithms, interface, and brassboard applications to provide improved automated access to large collections of digital multimedia data used by field commanders.
- (U) Developed and demonstrated advanced interrogative techniques which fully exploit the available information to the warfighter. (\$400K)
- (U) Designed an automated voice translation system for multi-language military interrogation and informant screening.

(U) FY 1995:

- (U) Develop advanced imagery information technologies to enhance warfighter mission planning, navigation, targeting, and terrain analysis. (\$2,070K)
- (U) Develop methods to automatically maintain the currency and accuracy of databases used by a wide range of advanced weapons systems for planning, navigation, and mission strike purposes.
- (U) Develop a an electronic information portable correlator for warfighter use in a tactical environment; develop fusion modules incorporating human-like reasoning to track mobile components of the electronic warfare environment.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#3, Advanced Development	PE 0603726F, Command, Control, and Communications (C3) Subsystems Integration	2810	
<ul style="list-style-type: none"> - (U) Develop and demonstrate automated capabilities to assess, process, and display hypermedia communications which fully exploit the data available to the field commander in a timely manner. (\$925K) -- (U) Complete and demonstrate Phase 1 hypermedia brassboard; implement hypermedia interface interim support video/audio and automated linking capability to provide automated integration of video and audio media with text and graphics media. - (U) Develop and demonstrate advanced interrogative techniques which fully exploit the information available to the commander. (\$220K) -- (U) Demonstrate preliminary multilingual, bi-directional voice translation interrogation algorithms; develop an operational user demonstration system for field interrogation. <p>(U) <u>FY 1996:</u></p> <ul style="list-style-type: none"> - (U) Develop and demonstrate advanced imagery information sensor fusion and spatial database technologies to enhance warfighter mission planning, navigation, targeting, and terrain analysis. (\$3,315K) -- (U) Develop a transportable electronic information correlator and automated message update, filter, and retrieval processes; demonstrate Phase 1 multiple database integration and update capability using information and electronic messages; develop initial query robot for update analysis enhancement demonstration to support battlefield analysis. -- (U) Develop an all-source fusion capability to locate, identify, and track mobile red, green, and blue military components; complete system design and equipment/algorithm integration for correlation demonstration using sensor cueing and information acquisition module. - (U) Develop and demonstrate automated capabilities to access, process, and display hypermedia communications which fully exploit the data available to the field commander in a timely manner. (\$600K) -- (U) Complete integrated hypermedia demonstration to support video, audio, and automated linking; assess at operational exercises. - (U) Develop and demonstrate advanced interrogative techniques which fully exploit the information available to the warfighter. (\$100K) -- (U) Complete delivery of expanded language modules for the automated voice translation system; demonstrate to the user automated, multi-language, voice translation for field interrogation. 			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#3, Advanced Development	PE 0603726F, Command, Control, and Communications (C3) Subsystems Integration	2810	

(U) FY 1997:

- (U) Develop and demonstrate advanced imagery information and spatial database technologies to enhance warfighter mission planning, navigation, targeting, and terrain analysis. (\$4,100K)
- (U) Conduct Phase 2 demonstration of multiple database integration and update capability to maintain a single uniform and current vector database for real-time access; perform a final operational evaluation of the update analysis demonstration using a query robot to locate, retrieve, and fuse distribute multisource intelligence data at the user site.
- (U) Complete integration and installation testing of portable electronic information correlator for deployment with tactical communications systems to automatically correlate multisensor inputs on the battlefield; conduct final demonstration at user's site of the enhanced, all-source, sensor fusion capability to locate, identify, and track mobile friend and foe (i.e., threats and targets) battlefield components.
- (U) Develop and demonstrate automated capabilities to access, process, and display hypermedia communications which fully exploit the data available to the field commander in a timely manner. (\$275K)
- (U) Design and integrate hypermedia algorithms for use with additional operational user databases and navigational aids capabilities.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995																		
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.																			
#3, Advanced Development	PE 0603726F, Command, Control, and Communications (C3) Subsystems Integration	2810																			
<p>B. (U) <u>Program Change Summary (\$ in Thousands):</u></p> <table border="0"> <thead> <tr> <th></th> <th>FY 1994</th> <th>FY 1995</th> <th>FY 1996</th> <th>FY 1997</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Previous President's Budget</td> <td>2,400</td> <td>3,295</td> <td>6,030</td> <td>7,630</td> <td>Cost</td> </tr> <tr> <td>Current President's Budget</td> <td>2,400</td> <td>3,215</td> <td>4,015</td> <td>4,375</td> <td>Cont</td> </tr> </tbody> </table> <p>Change Summary Explanation:</p> <p>Funding: Increases from FY 1995 to FY 1996 are to address added emphasis of image/information technologies to meet user-identified deficiencies. This technology directly supports the Joint Chiefs of Staff Future Joint Warfighting Capability: "To maintain near perfect real-time knowledge of the enemy and communicate that to all forces in near-real-time."</p> <p>Schedule: Not Applicable.</p> <p>Technical: Not Applicable.</p> <p>C. (U) <u>Other Program Funding Summary:</u></p> <p>(U) <u>Related Activities:</u></p> <ul style="list-style-type: none"> - (U) PE 0602702F, C3. - (U) PE 0603789F, C3 Advanced Development. - (U) PE 0603728F, Advanced Computer Technology. - (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication. <p>D. (U) <u>Schedule Profile:</u> Not Applicable.</p>					FY 1994	FY 1995	FY 1996	FY 1997	Total	Previous President's Budget	2,400	3,295	6,030	7,630	Cost	Current President's Budget	2,400	3,215	4,015	4,375	Cont
	FY 1994	FY 1995	FY 1996	FY 1997	Total																
Previous President's Budget	2,400	3,295	6,030	7,630	Cost																
Current President's Budget	2,400	3,215	4,015	4,375	Cont																

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY		PE NUMBER AND TITLE								DATE	PROJECT NO.
#3, Advanced Development		PE 0603726F, Command, Control, and Communications (C3) Subsystems Integration								February 1995	2863
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Project 2863, Integrated Photonics	4,014	4,179	4,320	2,870	3,222	3,724	3,799	3,933	Cont	Cont	
<p>A. (U) <u>Mission Description and Budget Item Justification:</u> Current electronic systems are susceptible to electromagnetic interference, electromagnetic pulse, and radio frequency (RF) interference. Size constraints, speed, and reliability also limit traditional electronic systems. Photonics-based systems, which process information in the form of light (photonics) signals, will provide major improvements in tactical and strategic C3 systems by providing small-size, high-performance, high-capacity, survivable alternatives to electronic-based systems. This project demonstrates advanced hardware technology in optical processing, adaptive transmission, and nonlinear optical processing.</p> <p>(U) <u>FY 1994:</u></p> <ul style="list-style-type: none"> - (U) Developed and demonstrated analog and digital optical processing technologies to provide real-time data for pre- and post-mission analysis, as well as jam-resistant sources for tactical and C3 systems. (\$1,200K) - (U) Developed an optical steering processor to provide reduced susceptibility from jamming of communications and surveillance antennas. - (U) Developed and demonstrated microwave/millimeter-wave photonics processing and subsystems essential for advanced optically-controlled RF systems; designed an optically-controlled phased array for super high frequency (SHF) operations. (\$2,814K) - (U) Developed two 18-giga Hertz optical link antenna remoting functions for imagery/information and communications. - (U) Demonstrated (in the L-band) feasibility of using SHF optically-controlled antenna phased arrays for surveillance radars. <p>(U) <u>FY 1995:</u></p> <ul style="list-style-type: none"> - (U) Develop and demonstrate analog and digital optical processing technologies to provide real-time data for pre- and post-mission analysis, as well as sensor integration and automatic target identification using multispectral surveillance systems. (\$755K) - (U) Develop residual number system optical processor for multijammer nulling system; provide a faster processing algorithm for radar systems. - (U) Design an integrated, optical processor to provide agile, all optical, general purpose processors for current and future radars. - (U) Develop and demonstrate microwave/millimeter-wave photonics processing and subsystems essential for advanced optically-controlled radio frequency (RF) systems at increased frequencies. (\$3,424K) - (U) Conduct design and trade-off analyses for SHF phased array antenna beamformers to provide the optimum design for a new method of steering SHF communications systems. - (U) Demonstrate coherent, optically-controlled phased array for advanced multiband communications and surveillance missions. 											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#3, Advanced Development	PE 0603726F, Command, Control, and Communications (C3) Subsystems Integration	2863	
<p>(U) <u>FY 1996:</u></p> <ul style="list-style-type: none"> - (U) Develop and demonstrate analog and digital optical processing technologies to provide the warfighter with real-time data for pre- and post-mission analysis, as well as sensor integration and automatic target identification using multispectral surveillance systems. (\$1,008K) -- (U) Develop, fabricate, and integrate photonic C3 processor providing reliable, agile, all-optical, general purpose processors for current and future radars. - (U) Develop and demonstrate microwave/millimeter-wave photonics processing and subsystems essential for advanced optically-controlled radio frequency (RF) systems at increased frequencies. (\$3,312K) -- (U) Fabricate super high frequency (SHF) optically-controlled phased array antenna demonstrating the agility necessary to steer communications antennas. -- (U) Conduct first stage development of 100 giga-Hertz (GHz) RF photonic interconnect system extending the frequency and bandwidth of previous microwave link programs to support communications. <p>(U) <u>FY 1997:</u></p> <ul style="list-style-type: none"> - (U) Develop and demonstrate analog and digital optical processing technologies to provide real-time data for pre- and post-mission analysis, as well as sensor integration and automatic target identification using multispectral surveillance systems. (\$800K) -- (U) Complete development and integration of a photonic C3 processor into a technology demonstrator; task will demonstrate the advantages of all-optical, high-speed agile processors in a variety of radar and communications functions. - (U) Develop and demonstrate microwave/millimeter-wave photonics processing and subsystems for advanced optically-controlled RF systems at increased frequencies. (\$2,070K) -- (U) Fabricate and conduct initial integration testing of SHF, optically-controlled phased array antenna components. -- (U) Test 100-GHz-RF photonic interconnect system; conduct preliminary testing of extra high frequency optically-controlled, phased array antenna system, extending the frequency and bandwidth of previous microwave link programs. 			

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

#3, Advanced Development

PE 0603726F, Command, Control, and Communications (C3)
Subsystems Integration 2863

B. (U) Program Change Summary (\$ in Thousands):

Previous President's Budget
Current President's Budget

FY 1994
4,064
4,014

FY 1995
4,255
4,179

FY 1996
4,950
4,320

Total
Cost
Cont
Cont

FY 1997
5,000
2,870

Change Summary Explanation:

Funding: Increases from FY 1995 to FY 1996 are to address added emphasis of photonics technologies to meet future user requirements. This technology directly supports the Joint Chiefs of Staff Future Joint Warfighting Capability: "To maintain near perfect real-time knowledge of the enemy and communicate that to all forces in near-real-time."

Schedule: Not Applicable.

Technical: Not Applicable.

C. (U) Other Program Funding Summary:(U) Related Activities:

- (U) PE 0602702F, C3.
- (U) PE 0603789F, C3 Advanced Development.
- (U) PE 0603728F, Advanced Computer Technology.
- (U) PE 0603203F, Advanced Avionics for Aerospace Vehicles.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

D. (U) Schedule Profile: Not Applicable.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#3, Advanced Development		PE 0603726F, Command, Control, and Communications (C3) Subsystems Integration								3192	
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Project 3192, Advanced Optical Memory Technology	2,133	3,420	3,673	3,726	4,740	5,242	5,506	5,702	Cont	Cont	
<p>A. (U) <u>Mission Description and Budget Item Justification:</u> Present C3 systems lack low-cost, high-density data storage capacity and performance required for advanced operations and near-real-time sensor inputs. This project develops the Strategic/Tactical Optical Disk System (S/TODS) a family of erasable data optical storage systems with high capacity and fast input/output speed. S/TODS includes a single 5.25-inch optical disk recorder/player, a single 14-inch optical disk recorder/player, and a ten-disk automated Optical Jukebox. The 5.25-inch S/TODS is for fighter aircraft operation and provides fast airborne access to mission-oriented data and the digital terrain system. The 14-inch S/TODS is for on-board sensor data recording in electronic surveillance aircraft and will be used to develop a deployable optical Jukebox for operational mission planning requirements. For large storage requirements, the Optical Jukebox will be expanded for Air Combat Command's (ACC) Contingency Airborne Reconnaissance System (CARS). In addition, the Optical Jukebox can be applied to ACC's requirements for high-volume, soft-copy, digital imagery exploitation. Algorithms will be provided to automate the selection, retrieval, and downloading of information/image data to combat systems. An array of optical disk drives will be developed for high throughput speed and fault-tolerant requirements. Three-dimensional (3D) optical memory systems will be developed for volumetric digital data storage. This new mass storage technology will demonstrate ultra-high data density and fast, parallel data access within a low-cost, compact system.</p> <p>(U) <u>FY 1994:</u></p> <ul style="list-style-type: none"> - (U) Developed and demonstrated optical information data handling, storage, and access technologies for strategic and tactical applications. (\$433K) - (U) Designed an array of optical disk drives for high-speed, fault-tolerant computational system applications which provide analysts with immediate access to critical data bases. - (U) Designed, developed, and demonstrated optical disk and interface technologies which can be implemented in joint theater operations. (\$1,700K) - (U) Designed and fabricated a deployable Optical Jukebox system to store and retrieve digital maps, charts, and imagery needed to perform mission planning via combat aircraft and satisfy storage requirements for on-line imagery/information systems. <p>(U) <u>FY 1995:</u></p> <ul style="list-style-type: none"> - (U) Develop and demonstrate optical information data handling, storage, and access technologies for strategic and tactical applications. (\$1,800K) - (U) Fabricate an advanced optical disk array using commercial storage items, reducing life-cycle costs associated with mass data storage and increase analyst productivity. - (U) Design an optical three-dimensional (3D) computer memory, to store more imagery/information in a smaller package while providing fast, parallel access to large data bases. 											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	PROJECT NO.
BUDGET ACTIVITY	PE NUMBER AND TITLE		
#3, Advanced Development	PE 0603726F, Command, Control, and Communications (C3) Subsystems Integration	3192	
-	(U) Design, develop, and demonstrate optical disk and interface technologies which can be implemented in joint theater operations. (\$1,620K)		
--	(U) Design high-capacity Optical Jukebox to provide terabytes of data storage and automated, robotic access to hundreds of erasable optical disks, reducing personnel requirements needed to maintain digital storage library holdings.		
--	(U) Demonstrate a deployable Optical Jukebox through interface with the COMBAT TALON mission planning system.		
--	(U) Conduct preliminary design for mass storage/retrieval and dissemination to allow the analyst to handle data management functions and eliminate redundant information.		
(U)	FY 1996:		
-	(U) Develop and demonstrate optical information data handling, storage, and access technologies for strategic and tactical applications. (\$1,323K)		
--	(U) Develop a high-fault-tolerant array of optical disk drives providing 10 gigabytes of on-line storage, data access time less than 50 milliseconds, and three megabytes per second data transfer speeds to interface with data bases.		
--	(U) Develop a three-dimensional (3-D) optical computer memory system, addressing architectural issues and storage media performance; provide needed storage capacity and input/output bandwidth for next-generation aircrew training and data handling.		
-	(U) Design, develop, and demonstrate optical disk and interface technologies which can be implemented in joint theater operations. (\$2,350K)		
--	(U) Develop an automated, high-capacity Optical Jukebox that can store and retrieve several 14-inch diameter, rewritable optical disks; examine large diameter rewritable media capable of storing 15-gigabytes/disk and an optical drive capable of high-speed data recording, playback, and erasure as a means of providing critical data storage to meet user's growing requirements.		
--	(U) Design and develop a mass storage retrieval algorithm-based approach used to query and retrieve information from a large mass storage system; algorithms will control all mass data storage operations and provide user access to multiple terabytes of data.		
(U)	FY 1997:		
-	(U) Develop and demonstrate optical information data handling, storage, and access technologies for strategic and tactical applications. (\$2,169K)		
--	(U) Fabricate pre-brassboard model of a 3-D optical memory capable of storing 100 gigabytes of information and reconstructing it using a parallel optical readout technique; exploit virtual reality technology using digital data stored and accessed via 3D optical memories.		
-	(U) Design, develop, and demonstrate optical disk and interface technologies which can be implemented in joint theater operations. (\$1,557K)		
--	(U) Complete the fabrication and demonstration of high-capacity Optical Jukebox interfaced with an information network.		
--	(U) Complete algorithm development and demonstrate capability to select, retrieve, and store digital data from different sources and transfer such data to field units.		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995																		
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.																			
#3, Advanced Development	PE 0603726F, Command, Control, and Communications (C3) Subsystems Integration	3192																			
<p>B. (U) <u>Program Change Summary (\$ in Thousands):</u></p> <table border="0"> <thead> <tr> <th></th> <th>FY 1994</th> <th>FY 1995</th> <th>FY 1996</th> <th>FY 1997</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Previous President's Budget</td> <td>2,153</td> <td>3,500</td> <td>4,588</td> <td>5,901</td> <td>Cost</td> </tr> <tr> <td>Current President's Budget</td> <td>2,133</td> <td>3,420</td> <td>3,673</td> <td>3,726</td> <td>Cont</td> </tr> </tbody> </table> <p>Change Summary Explanation: Funding: Increases from FY 1995 to FY 1996 are to address added emphasis of optical memory technology to meet user needs. This technology directly supports the Joint Chiefs of Staff Future Joint Warfighting Capability: "To maintain near perfect real-time knowledge of the enemy and communicate that to all forces in near-real-time."</p> <p>Schedule: Not Applicable. Technical: Not Applicable.</p> <p>C. (U) <u>Other Program Funding Summary:</u></p> <p>(U) <u>Related Activities:</u></p> <ul style="list-style-type: none"> - (U) PE 0602702F, C3. - (U) PE 0603789F, C3 Advanced Development. - (U) PE 0603728F, Advanced Computer Technology. - (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication. <p>D. (U) <u>Schedule Profile:</u> Not Applicable.</p>					FY 1994	FY 1995	FY 1996	FY 1997	Total	Previous President's Budget	2,153	3,500	4,588	5,901	Cost	Current President's Budget	2,133	3,420	3,673	3,726	Cont
	FY 1994	FY 1995	FY 1996	FY 1997	Total																
Previous President's Budget	2,153	3,500	4,588	5,901	Cost																
Current President's Budget	2,133	3,420	3,673	3,726	Cont																

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE									
#3, Advanced Development		PE 0603728F, Advanced Computer Technology									
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Total PE 0603728F Cost	9,012	9,013	11,005	10,076	11,248	11,504	12,142	12,037	Cont	Cont	
Project 2527, Software Life Cycle Tools	2,924	3,275	3,160	2,927	3,348	3,411	3,670	3,637	Cont	Cont	
Project 2530, Distributed Systems Reliability and Survivability	2,076	2,000	3,445	2,999	3,400	3,500	3,742	3,700	Cont	Cont	
Project 2532, Knowledge-Based Systems	4,012	3,738	4,400	4,150	4,500	4,593	4,730	4,700	Cont	Cont	
<p>A. (U) Mission Description and Budget Item Justification: This Advanced Development program develops and demonstrates technologies needed to control cost, reduce risk, and increase efficiency and effectiveness of software and computers required for mission critical combat systems. DOD has experienced a dramatic escalation in the cost of acquiring and maintaining embedded computer software for increasingly complex military systems which must be reliable and survivable in the battlefield environment. The requirement for survivable tactical and strategic computing systems has driven the need for automatic integration and interoperability of multiple processing elements, automatic redistribution of data and functions, and location-independent access of data. Air Force is the lead DOD agency developing distributed systems and data bases which are essential to meet future requirements. Distributed processing techniques, which can dynamically reconfigure assets to accommodate lost components or nodes, are required to ensure survivable mission critical command and control functions. All efforts in this program element contain the resources necessary, including civilian salaries, to manage, conduct, and document the technical activities.</p>											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)				DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE			
#3, Advanced Development		PE 0603728F, Advanced Computer Technology			
B. (U) <u>Program Change Summary (\$ in Thousands):</u>					
Previous President's Budget	FY 1994	FY 1995	FY 1996	FY 1997	Total
Appropriated Value	8,074	9,125	15,060	18,127	Cost
Adjustments to Appropriated Value:	8,119	9,125			Cont
a. Congressional General Reductions	-45	-112			
b. SBIR	-112				
c. Below Threshold Reprogrammings	1,050				
Current President's Budget	9,012	9,013	11,005	10,076	Cont
Change Summary Explanation:					
Funding: Increases from FY 1995 to FY 1996 are to address computer technology user-identified deficiencies. This technology directly supports the Joint Chiefs of Staff Future Joint Warfighting Capability: "To maintain near perfect real-time knowledge of the enemy and communicate that to all forces in near-real-time."					
Schedule: Not Applicable.					
Technical: Not Applicable.					
C. (U) <u>Other Program Funding Summary:</u> Not Applicable.					
D. (U) <u>Schedule Profile:</u> Not Applicable.					

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DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

#3, Advanced Development

PE 0603728F, Advanced Computer Technology

2527

COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Project 2527, Software Life Cycle Tools	2,924	3,275	3,160	2,927	3,348	3,411	3,670	3,637	Cont	Cont

A. (U) Mission Description and Budget Item Justification: Advanced computer systems in Air Force weapon systems require software life cycle tools and software engineering technology to reduce costs, improve quality and enhance productivity. This project develops, evaluates, and transitions new software engineering technology that reduces cost, while improving software, systems, and productivity factors. It develops software life cycle support environments which incorporate both off-the-shelf and laboratory products. These environments provide a vehicle for software technology integration, transition, and evaluation under operational and field conditions. Technologies for system requirements analysis, reuse of software components, software quality specification, measurement, assessment, and high performance (parallel) computer software engineering are also produced.

(U) FY 1994:

- (U) Developed and demonstrated system software support environments which address the system life cycle for parallel and concurrent systems while emphasizing affordability and software reuse certification technologies. (\$916K)
- (U) Developed the Process Oriented Software Life Cycle Support Environment (ProSLCSE) with improved windows-based user interface and facilities for defining and managing critical software production and post-development support.
- (U) Developed Phase 1 advanced system engineering components and integrated them into a software/system engineering architectural environment.
- (U) Developed and demonstrated system definition technologies to provide the user the means to address total system requirements engineering for large-scale systems. (\$1,145K)
- (U) Successfully demonstrated the software and systems requirements engineering environment (REE) and transitioned it to the product center for application to systems safety.
- (U) Developed and demonstrated software and system quality enhancements through automated tools and methods. (\$613K)
- (U) Completed design of a software quality information repository which can handle large scale data storage and production technology.
- (U) Developed high performance computer software and architecture for weapon system applications. (\$250K)
- (U) Incorporated FORTRAN and "C++" languages into the Parallel Assessment Windowing System (PAWS).
- (U) Developed preliminary testing techniques for parallel software tools.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE February 1995
BUDGET ACTIVITY #3, Advanced Development	PE NUMBER AND TITLE PE 0603728F, Advanced Computer Technology	PROJECT NO. 2527

<p>(U) <u>FY 1995:</u></p> <ul style="list-style-type: none"> - (U) Develop and demonstrate system software support environments which address the system life cycle for parallel and concurrent systems while emphasizing affordability and software reuse certification technologies. (\$835K) -- (U) Complete development of the process description, simulation, and enactment portions of the Process Oriented Software Life Cycle Support Environment (ProSLCSE) Enhancements program and transition to the user. -- (U) Develop Phase 2 advanced system engineering components, based on industry standards, and integrate them into the software/system engineering architectural environment. -- (U) Develop a certification framework for reusable software; demonstrate the capability of reusable software components to estimate software size, reliability, maintainability, and flexibility. - (U) Develop and demonstrate system definition technologies to provide the user the means to address total system requirements engineering for large-scale systems. (\$1,605K) -- (U) Develop preliminary requirements engineering workstation (Block 1) for requirements specification and assessment. -- (U) Develop additional technology demonstration applications for requirements engineering technology transfer. - (U) Develop and demonstrate software and system quality enhancements through automated tools and methods. (\$585K) -- (U) Expand development of information on software quality assessment and complete the initial set of software metric baselines. -- (U) Develop preliminary case for a software quality technology demonstration; provide the first increment of software information for the repository. - (U) Develop high performance computer software and architecture for weapon system applications. (\$250K) -- (U) Complete development of testing techniques for parallel software tools. -- (U) Develop level one architecture parallel design tools. -- (U) Conduct Phase 1 effort to optimize parallel software upgrades to the Parallel Assessment Windowing System (PAWS); provide a "user friendly" interface for adding new architectures and execution criteria. <p>(U) <u>FY 1996:</u></p> <ul style="list-style-type: none"> - (U) Develop and demonstrate system software support environments which address the system life cycle for parallel and concurrent systems while emphasizing affordability and software reuse certification technologies. (\$1,085K) -- (U) Develop Phase 3 advanced system engineering components, based on industry standards, and integrate them into the software/system engineering architectural environment. -- (U) Complete the certification framework for reusable software; demonstrate the capability to expand the framework for domain-specific reuse environments.

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#3, Advanced Development

PE 0603728F, Advanced Computer Technology

2527

- (U) Develop and demonstrate system definition technologies to provide the user the means to address total system requirements engineering for large-scale systems. (\$887K)
 - (U) Develop a performance modeling demonstration of advanced requirements engineering workstation (Block 1).
 - (U) Conduct requirements engineering demonstrations to transfer technology to industry.
 - (U) Develop and demonstrate software and system quality enhancements through automated tools and methods. (\$200K)
 - (U) Develop additional case studies for the software quality technology demonstration; provide second increment of repository software information installation.
 - (U) Develop high performance (parallel) computer software and architecture for weapon system applications. (\$988K)
 - (U) Conduct Phase 2 effort to optimize parallel software upgrades to the Parallel Assessment Windowing System (PAWS); provide a "user friendly" interface for adding new architectures and execution criteria.
 - (U) Develop level two architecture-independent parallel design tool.
- (U) FY 1997:
- (U) Develop and demonstrate system software support environments which address the system life cycle for parallel and concurrent systems while emphasizing affordability and software reuse certification technologies. (\$861K)
 - (U) Complete level one advanced systems engineering components integration demonstration; provide tool building kit for the automation of specialized system engineering tools.
 - (U) Conduct preliminary design development of level two advanced system engineering environment.
 - (U) Develop Phase 1 domain-specific reusable software components and integrate into the certification framework as a general reuse capability.
 - (U) Develop and demonstrate system definition technologies to provide the user the means to address total system requirements engineering for large-scale systems. (\$974K)
 - (U) Complete the development performance modeling aspect of the Block 1 advanced requirements engineering workstation.
 - (U) Based on industry comments, user feedback, and the need for addressing system-level requirements engineering, conduct a program assessment of the requirements engineering environment/workstation and identify needed improvements.
 - (U) Develop and demonstrate software and system quality enhancements through automated tools and methods. (\$387K)
 - (U) Complete all case studies for software quality technology demonstration; provide third increment of repository software information.
 - (U) Develop high performance (parallel) computer software and architecture for weapon system applications. (\$705K)
 - (U) Conduct Phase 3 effort to optimize parallel software upgrades to the PAWS; provide a "user friendly" interface for adding new architectures and execution criteria.
 - (U) Complete development efforts for on architecture-independent parallel design tool.

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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.																			
#3, Advanced Development	PE 0603728F, Advanced Computer Technology	2527																			
<p>B. (U) <u>Program Change Summary (\$ in Thousands):</u></p> <table border="0"> <thead> <tr> <th></th> <th>FY 1994</th> <th>FY 1995</th> <th>FY 1996</th> <th>FY 1997</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Previous President's Budget</td> <td>2,624</td> <td>3,325</td> <td>4,060</td> <td>5,127</td> <td>Cost</td> </tr> <tr> <td>Current President's Budget</td> <td>2,924</td> <td>3,275</td> <td>3,160</td> <td>2,927</td> <td>Cont</td> </tr> </tbody> </table> <p>Change Summary Explanation:</p> <p>Funding: Increases from FY 1995 to FY 1996 are to address added emphasis on software life cycle tool development to meet user requirements. This technology directly supports the Joint Chiefs of Staff Future Joint Warfighting Capability: "To maintain near perfect real-time knowledge of the enemy and communicate that to all forces in near-real-time."</p> <p>Schedule: Not Applicable.</p> <p>Technical: Not Applicable.</p> <p>C. (U) <u>Other Program Funding Summary:</u></p> <p>(U) <u>Related Activities:</u></p> <ul style="list-style-type: none"> - (U) PE 0604740F, Computer Resource Management. - (U) PE 0701112F, Inventory Control Point Operation. - (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication. <p>D. (U) <u>Schedule Profile:</u> Not Applicable.</p>					FY 1994	FY 1995	FY 1996	FY 1997	Total	Previous President's Budget	2,624	3,325	4,060	5,127	Cost	Current President's Budget	2,924	3,275	3,160	2,927	Cont
	FY 1994	FY 1995	FY 1996	FY 1997	Total																
Previous President's Budget	2,624	3,325	4,060	5,127	Cost																
Current President's Budget	2,924	3,275	3,160	2,927	Cont																

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE		February 1995	
PROJECT NO.		2530	
BUDGET ACTIVITY		PE NUMBER AND TITLE	
#3, Advanced Development		PE 0603728F, Advanced Computer Technology	
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate
	2,076	2,000	3,445
		FY 1997 Estimate	FY 1998 Estimate
		2,999	3,400
		FY 1999 Estimate	FY 2000 Estimate
		3,500	3,742
		FY 2001 Estimate	Cost to Complete
		3,700	Cont
			Total Cost
			Cont

A. (U) Mission Description and Budget Item Justification: This project develops technology to provide the distributed information handling for future Command, Control, Communications, and Computer (C4) systems which integrate numerous heterogeneous processing clusters and provides secure, seamless access to any information. The system must be reconfigurable, operate in real-time, and be survivable, as well as capable of integrating the full spectrum of multimedia data. The system will operate in an "information pull" mode where the users' requests for information are filled without explicit action on the part of the user to locate, retrieve, or merge data. An object-oriented architecture will be used to provide a common perspective which will serve as the basis for the merger between the communications control system and the distributed computing environment.

(U) FY 1994:

- (U) Developed and demonstrated distributed computing systems for survivability using computer cluster technologies. (\$700K)
- (U) Demonstrated fault tolerance capability in a distributed computing environment to support high reliability applications.
- (U) Successfully demonstrated the first level application of distributed computing technologies to generate air tasking orders during the Joint Warrior Integrated Demonstration 94 (JWID 94).
- (U) Developed an enhanced distributed computing environment through the integration of new technologies into current models.
- (U) Developed and demonstrated database system techniques for managing multimedia data in distributed systems. (\$500K)
- (U) Developed data models for object definitions for use in multimedia data systems.
- (U) Developed storage and retrieval concepts for distributed multimedia objects.
- (U) Developed object management techniques for information packets and asynchronous switching based networks.
- (U) Developed and demonstrated real-time distributed computing to support crisis management. (\$876K)
- (U) Developed real-time capability for distributed computing environment by integration of new system software.
- (U) Demonstrated crisis support through transparent distributed data access for planning in JWID 94.
- (U) Developed system capabilities for commercially compatible switching technology support for real-time computing in crisis management.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE February 1995
BUDGET ACTIVITY #3, Advanced Development	PE NUMBER AND TITLE PE 0603728F, Advanced Computer Technology	PROJECT NO. 2530

<p>(U) <u>FY 1995:</u></p> <ul style="list-style-type: none"> - (U) Develop and demonstrate distributed computing systems for survivability using computer cluster technologies. (\$800K) - (U) Demonstrate second level use of distributed computing to support the field commander in generating air tasking orders. - (U) Demonstrate a distributed computing infrastructure for developing collaborative planning which can be incorporated into Joint Warrior Integrated Demonstration 95 (JWID 95). - (U) Demonstrate the first object-based distribution computing environment which is compliant with established standards. - (U) Develop and demonstrate database system techniques for managing multimedia data in distributed systems. (\$580K) - (U) Develop uniform object model for multimedia data management. - (U) Develop storage and retrieval capability for multimedia objects. - (U) Demonstrate an asynchronous switching-based testbed to support management of text, graphics, and video imagery. - (U) Develop and demonstrate real-time distributed computing to support crisis management. (\$620K) - (U) Demonstrate feasibility of using intelligent agents to provide adaptive fault management. - (U) Demonstrate single cluster, homogeneous, real-time distributed computing. - (U) Demonstrate adaptive resource allocation in an object-based distributed computing environment. <p>(U) <u>FY 1996:</u></p> <ul style="list-style-type: none"> - (U) Develop and demonstrate heterogeneous, secure, multi-clustered distributed computing environments for interoperability and survivability. (\$1,645K) - (U) Demonstrate distributed computing environment for a distributed air operations center. - (U) Demonstrate commercially compatible switching-based distributed computing environment. - (U) Develop distributed virtual computing architecture and computation model. - (U) Develop and demonstrate distributed database management system techniques for multimedia data in distributed information systems. (\$800K) - (U) Develop distributed query capability for multimedia database management system. - (U) Demonstrate concurrence mechanisms for multimedia database management in a distributed information system. - (U) Establish tri-Service testbed for the development of multimedia distributed database management. - (U) Develop real-time, adaptive distributed computing environments to support crisis management and survivability. (\$1,000K) - (U) Demonstrate use of intelligent agents for adaptive distributed resource management. - (U) Demonstrate real-time distributed computing across multiple local clusters. - (U) Develop standard specification for real-time computing in an object based distributed computing environment. 	
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BUDGET ACTIVITY #3, Advanced Development	PE NUMBER AND TITLE PE 0603728F, Advanced Computer Technology	PROJECT NO. 2530

(U) FY 1997:

- (U) Develop and demonstrate heterogeneous, secure, multi-clustered distributed computing environments for interoperability and survivability. (\$1,000K)
- (U) Demonstrate the integration of security mechanisms into multi-clustered distributed computing environments.
- (U) Demonstrate the ability to establish a distributed computing environment across a limited bandwidth interconnection.
- (U) Demonstrate the integration of mobile computing nodes into a heterogeneous distributed computing environment.
- (U) Develop and demonstrate distributed database management system techniques for multimedia data in distributed information systems. (\$1,000K)
- (U) Develop intelligent agents for retrieval of multimedia data across a wide area network.
- (U) Demonstrate the incorporation of speech as a managed object in an object-based multimedia database management system.
- (U) Demonstrate multimedia database management across multiple locally netted clusters.
- (U) Develop real-time, adaptive distributed computing environments to support crisis management and survivability. (\$999K)
- (U) Demonstrate an adaptive reconfigurable distributed computing environment based upon an application-derived parameter.
- (U) Demonstrate real-time distributed computing across heterogeneous clusters.
- (U) Demonstrate dynamic process and data migration across a multi-clustered distributed information system.

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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.																			
#3, Advanced Development	PE 0603728F, Advanced Computer Technology	2530																			
<p>B. (U) <u>Program Change Summary (\$ in Thousands):</u></p> <table border="0"> <thead> <tr> <th></th> <th>FY 1994</th> <th>FY 1995</th> <th>FY 1996</th> <th>FY 1997</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Previous President's Budget</td> <td>1,738</td> <td>2,000</td> <td>5,000</td> <td>6,000</td> <td>Cost</td> </tr> <tr> <td>Current President's Budget</td> <td>2,076</td> <td>2,000</td> <td>3,445</td> <td>2,999</td> <td>Cont</td> </tr> </tbody> </table> <p>Change Summary Explanation:</p> <p>Funding: Increases from FY 1995 to FY 1996 are to address added emphasis on distributed systems technology to solve user-identified deficiencies. This technology directly supports the Joint Chiefs of Staff Future Joint Warfighting Capability: "To maintain near perfect real-time knowledge of the enemy and communicate that to all forces in near-real-time."</p> <p>Schedule: Not Applicable.</p> <p>Technical: Not Applicable.</p> <p>C. (U) <u>Other Program Funding Summary:</u></p> <p>(U) <u>Related Activities:</u></p> <ul style="list-style-type: none"> - (U) PE 0604740F, Computer Resource Management. - (U) PE 0701112F, Inventory Control Point Operation. - (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication. <p>D. (U) <u>Schedule Profile:</u> Not Applicable.</p>					FY 1994	FY 1995	FY 1996	FY 1997	Total	Previous President's Budget	1,738	2,000	5,000	6,000	Cost	Current President's Budget	2,076	2,000	3,445	2,999	Cont
	FY 1994	FY 1995	FY 1996	FY 1997	Total																
Previous President's Budget	1,738	2,000	5,000	6,000	Cost																
Current President's Budget	2,076	2,000	3,445	2,999	Cont																

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DATE										February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#3, Advanced Development		PE 0603728F, Advanced Computer Technology								2532	
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Project 2532, Knowledge-Based Systems	4,012	3,738	4,400	4,150	4,500	4,593	4,730	4,700	Cont	Cont	
<p>A. (U) <u>Mission Description and Budget Item Justification:</u> Knowledge-based computer systems provide the capability to automatically solve reasoning problems. This effort develops computer technologies which automate the problem solving process associated with human thought. It has three major thrusts. The first, knowledge-based systems engineering, provides software tools and techniques to develop and evaluate knowledge-based systems. The second, knowledge-based planning, applies artificial intelligence (AI) technology to provide increased cost-effectiveness in diverse planning applications involving decision support to employment and deployment planning, logistics planning, resource allocation, and scheduling processes. The third, Knowledge-Based Software Assistant (KBSA), exploits knowledge-based methods to effect orders of magnitude improvements in software development and support activities.</p> <p>(U) <u>FY 1994:</u></p> <ul style="list-style-type: none"> - (U) Developed and demonstrated knowledge-based systems engineering technologies to support robust, real-time, large-scale knowledge-based systems. (\$612K) - (U) Developed framework for integration of independently developed software components - (U) Developed and demonstrated knowledge-based planning technologies to automate manpower-intensive tasks to allow rapid, accurate, and efficient planning. (\$2,300K) - (U) Completed in-house installation of a common environment to support development, testing, and integration of planning and scheduling tools for use in military planning. - (U) Demonstrated integrated crisis-action planning system, via distributed collaborative planning, during Joint Warrior Integrated Demonstration 94 (JWID 94). - (U) Developed and demonstrated Knowledge-Based Software Assistant (KBSA) technologies to effect a ten-fold improvement in software development and support. (\$1,100K) - (U) Developed pre-brassboard of KBSA technology. <p>(U) <u>FY 1995:</u></p> <ul style="list-style-type: none"> - (U) Develop and demonstrate knowledge-based systems engineering technologies to support robust, real-time, large-scale knowledge-based systems. (\$200K) - (U) Extend the architectural framework and demonstrate the capability to "mix and match" intelligent components in a dynamic information integration environment. 											

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- (U) Develop and demonstrate knowledge-based technologies to automate labor-intensive tasks to allow rapid, accurate, and efficient planning. (\$1,700K)
- (U) Develop initial version of in-theater airlift scheduler, using constraint based scheduling techniques; demonstrate the scheduler during the Joint Warrior Integrated Demonstration 95 (JWID 95).
- (U) Develop and integrate case-based force generation capabilities; demonstrate automated plan generation capabilities and end-to-end force and time-phased force deployment data generation.
- (U) Demonstrate seamless access to heterogeneous databases in support of deployment and operations planning.
- (U) Develop and demonstrate knowledge-based software assistant (KBSA) technologies to effect a ten-fold improvement in software development and support. (\$1,838K)
- (U) Develop brassboard KBSA demonstrating a formal methods, machine-mediated approach to the full cycle software development process.

(U) FY 1996:

- (U) Develop and demonstrate knowledge-based systems engineering technologies to support robust, real-time, large-scale knowledge-based systems. (\$200K)
- (U) Develop high level tools for rapid composition and integration of large bodies of existing code, data/knowledge bases, and subsystems.
- (U) Develop and demonstrate knowledge-based technologies to automate labor-intensive tasks to allow rapid, accurate, and efficient planning. (\$2,200K)
- (U) Complete model for mixed initiative planning incorporating computer learning techniques and "intelligent" computer based agents to support the air campaign planning process.
- (U) Integrate constraint based scheduling and modeling capabilities to support in-theater and strategic airlift.
- (U) Integrate knowledge-based planning technologies into the Joint Forces Air Component Commander planning system; demonstrate the integrated system.
- (U) Develop and demonstrate KBSA technologies to effect a ten-fold improvement in software development and support. (\$2,000K)
- (U) Demonstrate final KBSA advanced development model, supporting process representation, configuration management, text generation, instrumentation, and project management.

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BUDGET ACTIVITY #3, Advanced Development	PE NUMBER AND TITLE PE 0603728F, Advanced Computer Technology	PROJECT NO. 2532

(U) FY 1997:

- (U) Develop and demonstrate knowledge-based systems engineering technologies to support robust, real-time, large-scale knowledge-based systems. (\$300K)
- (U) Develop high level tools and methodology facilitating the evolution and integration of information sources and intelligent systems.
- (U) Develop and demonstrate knowledge-based technologies to automate labor-intensive tasks to allow rapid, accurate, and efficient planning. (\$2,100K)
- (U) Demonstrate generative planning and intelligent automated assistance for both planning and monitoring of joint air campaign.
- (U) Complete development of next-generation scheduling tool that enables developments of a wide range of schedules in support of problems with both resource and time constraints. Tools will support user modification of the scheduler based on changes in requirements, lift capabilities, and other scheduling parameters; demonstrate for Air Mobility Command strategic airlift.
- (U) Develop strategies for efficient planning scenario generation in various military domains.
- (U) Develop and demonstrate knowledge-based software assistant (KBSA) technologies to effect a ten-fold improvement in software development and support. (\$1,750K)
- (U) Extend KBSA integration; demonstrate and evaluate in mission critical application.

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BUDGET ACTIVITY	PE NUMBER AND TITLE																				
#3, Advanced Development	PE 0603728F, Advanced Computer Technology	February 1995	2532																		
<p>B. (U) <u>Program Change Summary (\$ in Thousands):</u></p> <table border="0"> <thead> <tr> <th></th> <th>FY 1994</th> <th>FY 1995</th> <th>FY 1996</th> <th>FY 1997</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Previous President's Budget</td> <td>3,712</td> <td>3,800</td> <td>6,000</td> <td>7,000</td> <td>Cost</td> </tr> <tr> <td>Current President's Budget</td> <td>4,012</td> <td>3,738</td> <td>4,400</td> <td>4,150</td> <td>Cont</td> </tr> </tbody> </table> <p>Change Summary Explanation:</p> <p>Funding: Increases from FY 1995 to FY 1996 are to address added emphasis on knowledge-based systems and technology to resolve user-identified deficiencies. This technology directly supports the Joint Chiefs of Staff Future Joint Warfighting Capability: "To maintain near perfect real-time knowledge of the enemy and communicate that to all forces in near-real-time."</p> <p>Schedule: Not Applicable.</p> <p>Technical: Not Applicable.</p> <p>C. (U) <u>Other Program Funding Summary:</u></p> <p>(U) <u>Related Activities:</u></p> <ul style="list-style-type: none"> - (U) PE 0604740F, Computer Resource Management. - (U) PE 0701112F, Inventory Control Point Operation. - (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication. <p>D. (U) <u>Schedule Profile:</u> Not Applicable.</p>					FY 1994	FY 1995	FY 1996	FY 1997	Total	Previous President's Budget	3,712	3,800	6,000	7,000	Cost	Current President's Budget	4,012	3,738	4,400	4,150	Cont
	FY 1994	FY 1995	FY 1996	FY 1997	Total																
Previous President's Budget	3,712	3,800	6,000	7,000	Cost																
Current President's Budget	4,012	3,738	4,400	4,150	Cont																

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BUDGET ACTIVITY			PE NUMBER AND TITLE							PROJECT NO.			
#4 - Demonstration & Validation			#0603742F: Combat Identification Technologies							2597			
COST (\$ in Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost		
Combat ID Technologies/ 2597		27,507	12,834	4,571	4,425	6,564	6,766	6,968	7,176	Cont.	Cont		

A. Mission Description and Budget Item Justification:

(U) The U.S. Combat Air Forces have a critical requirement to identify enemy, friendly, and neutral aircraft. Timely and reliable identification allows optimum employment of modern air-to-air weapons, reduces fratricide, and enables the battlefield commander to effectively manage and control the air battle. Positive identification (ID) is in the top ten of the Air Force's combat ID requirements. Aircraft may be placed at risk of being shot down or are at risk of mistakenly identifying targets unless reliable systems are developed. Such consequences have fostered the following operational requirements for combat ID systems:

- High confidence of ID
- High probability of ID (friend, foe, & neutral)
- Day/night capable
- Worldwide ops capable
- All weather capable

(U) Project Number: 2597: Combat Identification Technologies: The Combat ID Technologies program element develops, demonstrates, and transitions promising target identification technologies to meet the requirements cited above. Project 2597 primarily funds an identification technique code named HAVE CENTAUR. Current and planned accomplishments by Fiscal Year are as follows:

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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#4 - Demonstration & Validation	#0603742F:Combat Identification Technologies	2597	
<div>(U) <u>FY 1994 (Millions of \$)</u></div> <div><ul style="list-style-type: none">(U) Continued HAVE CENTAUR advanced technology demonstration and initial design verification. Large funding increment required due to bulk of Dem/Val activity. Provides tech support to include engineering, test and evaluation, configuration control, and other program office operations (\$21.4).(U) Design and Analysis of Reference Threat Systems (DARTS) synthetic database development continues (\$1.8).(U) Continued to demonstrate impact of fusing sensor data (\$0.9).(U) Continued development of system to document, manage, validate, and disseminate radar signatures (\$0.7).(U) Funded CID program management and low cost, high leverage demonstrations to increase CID capability through the Combat ID Integration Management Team (CID IMT) at Hanscom AFB, MA (ESC/ZJI) (\$2.7).</div> <div>(U) <u>FY 1995 (Millions of \$)</u></div> <div><ul style="list-style-type: none">(U) Continue HAVE CENTAUR development, completes system development and installs test hardware in roofhouse facility (\$10.0).(U) Begin ground-to-air roofhouse testing on UHRR capability at contractor facility (\$1.2).(U) Funds CID program management and low cost, high leverage demonstrations to increase CID capability-CID IMT (\$0.4).(U) Begin initial air-to-air UHRR hardware testing (\$1.2).</div> <div>(U) <u>FY 1996 (Millions of \$)</u></div> <div><ul style="list-style-type: none">(U) Complete air-to-air hardware testing and finalize hardware transition package (\$2.0).(U) Continue combat ID classifier development for UHRR radar and continue ground-to-air ID classifier qualitative testing (\$2.2).(U) Supports CID IMT for program management and low cost, high leverage CID demos (\$0.4).</div> <div>(U) <u>FY 1997 (Millions of \$)</u></div> <div><ul style="list-style-type: none">(U) Complete UHRR ground-to-air ID classifier testing and begin airborne testing (\$3.1).(U) Twenty-five target database library expansion continues (\$0.3).(U) Supports CID IMT for CID program management (\$1.0).</div>			

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BUDGET ACTIVITY	PE NUMBER AND TITLE		
#4 - Demonstration & Validation	#0603742F: Combat Identification Technologies	February 1995	2597
B. (U) <u>Program Change Summary (\$ in Thousands)</u>			
Previous President's Budget	1994 27,948	1995 13,453	1996 4,594
Appropriated Value	27,948	13,453	4,594
Adjustments to Appropriated Value			
a. Cong Gen Reductions	-441	-396	-23
b. SBIR		-223	
c. Omnibus or Other Above Threshold Reprog			
d. Below Threshold Reprogramming			
Adjustments to Budget Years Since FY95 PB			
Current Budget Submit/President's Budget	27,507	12,834	4,571
Change Summary Explanation:			
Funding: FY 94-97 reductions for Congressional reductions (FY94-95) and inflation (FY96-97).			
Schedule: No changes.			
Technical: No changes.			
C. (U) <u>Other Program Funding Summary: Not Applicable.</u>			

Total
Cost
Cont.
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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.
#4 - Demonstration & Validation	#0603742F: Combat Identification Technologies	2597
<p>(U) <u>Work Performed By:</u> Hughes Aircraft, Los Angeles, CA; Westinghouse, Baltimore, MD; and Veda, Dayton, OH. Management: Air Force Wright Laboratory, F-15 and F-22 System Program Offices, Wright Patterson AFB, OH; AWACS System Program Office, Hanscom AFB, MA; and Rome Laboratory, Griffiss AFB, NY.</p> <p>(U) <u>Related Activities:</u> None.</p> <p>(U) <u>Other Appropriation Funds (\$ in Thousands):</u> Not Applicable.</p> <p>(U) <u>International Cooperative Agreements:</u> Not Applicable.</p>		

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

February 1995

PROJECT NO.

#0603742F:Combat Identification Technologies

Technologies 2597

	1994	1995	1996	1997
1	1	1	2	1
	2	2	3	2
	3	3	3	3
	4	4	4	4

	\bar{X}	\bar{PDR}	\bar{CDR}
1	1.0	0.0	0.0
2	1.0	0.0	0.0
3	1.0	0.0	0.0
4	1.0	0.0	0.0
5	1.0	0.0	0.0
6	1.0	0.0	0.0
7	1.0	0.0	0.0
8	1.0	0.0	0.0
9	1.0	0.0	0.0
10	1.0	0.0	0.0
11	1.0	0.0	0.0
12	1.0	0.0	0.0
13	1.0	0.0	0.0
14	1.0	0.0	0.0
15	1.0	0.0	0.0
16	1.0	0.0	0.0
17	1.0	0.0	0.0
18	1.0	0.0	0.0
19	1.0	0.0	0.0
20	1.0	0.0	0.0
21	1.0	0.0	0.0
22	1.0	0.0	0.0
23	1.0	0.0	0.0
24	1.0	0.0	0.0
25	1.0	0.0	0.0
26	1.0	0.0	0.0
27	1.0	0.0	0.0
28	1.0	0.0	0.0
29	1.0	0.0	0.0
30	1.0	0.0	0.0
31	1.0	0.0	0.0
32	1.0	0.0	0.0
33	1.0	0.0	0.0
34	1.0	0.0	0.0
35	1.0	0.0	0.0
36	1.0	0.0	0.0
37	1.0	0.0	0.0
38	1.0	0.0	0.0
39	1.0	0.0	0.0
40	1.0	0.0	0.0
41	1.0	0.0	0.0
42	1.0	0.0	0.0
43	1.0	0.0	0.0
44	1.0	0.0	0.0
45	1.0	0.0	0.0
46	1.0	0.0	0.0
47	1.0	0.0	0.0
48	1.0	0.0	0.0
49	1.0	0.0	0.0
50	1.0	0.0	0.0
51	1.0	0.0	0.0
52	1.0	0.0	0.0
53	1.0	0.0	0.0
54	1.0	0.0	0.0
55	1.0	0.0	0.0
56	1.0	0.0	0.0
57	1.0	0.0	0.0
58	1.0	0.0	0.0
59	1.0	0.0	0.0
60	1.0	0.0	0.0
61	1.0	0.0	0.0
62	1.0	0.0	0.0
63	1.0	0.0	0.0
64	1.0	0.0	0.0
65	1.0	0.0	0.0
66	1.0	0.0	0.0
67	1.0	0.0	0.0
68	1.0	0.0	0.0
69	1.0	0.0	0.0
70	1.0	0.0	0.0
71	1.0	0.0	0.0
72	1.0	0.0	0.0
73	1.0	0.0	0.0
74	1.0	0.0	0.0
75	1.0	0.0	0.0
76	1.0	0.0	0.0
77	1.0	0.0	0.0
78	1.0	0.0	0.0
79	1.0	0.0	0.0
80	1.0	0.0	0.0
81	1.0	0.0	0.0
82	1.0	0.0	0.0
83	1.0	0.0	0.0
84	1.0	0.0	0.0
85	1.0	0.0	0.0
86	1.0	0.0	0.0
87	1.0	0.0	0.0
88	1.0	0.0	0.0
89	1.0	0.0	0.0
90	1.0	0.0	0.0
91	1.0	0.0	0.0
92	1.0	0.0	0.0
93	1.0	0.0	0.0
94	1.0	0.0	0.0
95	1.0	0.0	0.0
96	1.0	0.0	0.0

Prod. FY98-02

X(OFP 1)

(U) Other: H/W EMD complete:, 1QFY00
LRIP start: 1QFY98 finish: 2QFY99
Production Complete: 4QFY02
IOC of UHRR capability for APG-63U: 4QFY98

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE		PROJECT NO.	
#4 - Demonstration & Validation		#0603742F:Combat Identification Technologies		2597	
A. (U) <u>Project Cost Breakdown (\$ in Thousands)</u>		<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>
1. HAVE CENTAUR					
H/W EMD and Classifier Dev/Qual		20,500	12,480	4,200	3,400
Synthetic Database Dev		1,800	0	0	0
2. Database Management (NAIC Support)			700	0	0
3. AWACS Fusion Eval Testbed		960	0	0	0
4. Combat ID Integ. Mgmt Team (CID IMT) (ESC/ZJI)		3,548	354	371	1,025
Total		27,507	12,834	4,571	4,425

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE February 1995
BUDGET ACTIVITY #4 - Demonstration & Validation	PE NUMBER AND TITLE #0603742F:Combat Identification Technologies	PROJECT NO. 2597
<p>B. (U) <u>Budget Acquisition History and Planning Information (\$ in Thousands):</u> Not Applicable.</p> <p>C. (U) <u>Funding Profile (\$ in Thousands):</u> Not Applicable.</p>		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.			
#3, Advanced Development		PE 0603771F, Industrial Preparedness Manufacturing Technology 2865											
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost			
PE 0603771F Cost	0	83,311	53,332	51,841	55,436	56,133	58,513	60,987	Cont	Cont			
Project 2865, Industrial Base Manufacturing Technology (ManTech)	0	83,311	53,332	51,841	55,436	56,133	58,513	60,987	Cont	Cont			
<p>A. (U) <u>Mission Description and Budget Item Justification:</u> This Advanced Development program develops and demonstrates new manufacturing process technologies and transition of processes into weapon systems design, development, acquisition, and sustainment. The purpose of the Manufacturing Science and Technology (MS&T) program is to make affordable mission capability a practical reality by expanding access to a capable, responsive, multi-use industrial base with efficiencies comparable to world-class enterprises. Accelerating shop floor manufacturing process maturation at every stage of development will be enhanced by an increased emphasis on cost, time, and quality risks in transition. Best processes will be evaluated and adapted for application. Where mature processes are not available, laboratory-developed initial process capabilities will be matured and inserted into weapon systems. The MS&T program goes beyond factory floor manufacturing processes to encompass every activity within an industrial enterprise, ranging from above-the-shop floor activities to supplier base interactions and performance. The strategies and best practices of world-class enterprises will be analyzed and the performance of defense suppliers benchmarked. The world's best industrial practices will be adapted and proven in multiple pilot projects and deployed in defense applications. The program's investment strategy emphasizes the selection of generic projects that will have broad application across multiple systems. The manufacturing technology effort was funded as part of PE 0708011F, Industrial Preparedness, in prior years. All efforts in this program element contain the resources necessary, including civilian salaries, to manage, conduct, and document the technical activities.</p>													

(U) FY 1994: Not Applicable.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.
#3, Advanced Development	PE 0603771F, Industrial Preparedness Manufacturing Technology 2865	
<p>(U) FY 1995:</p> <p>(U) Develop and demonstrate advanced processes for the manufacture of metals; demonstrate work cells and process maturation which improve precision, yield, and affordability of military hardware and establish repair processes to enable the life extension of high value, aging components and structures. (\$31,295K)</p> <p>-- (U) Initiate supplier base focused effort to improve quality and reduce cost of precision investment castings.</p> <p>-- (U) Continue effort to establish automated repair processes for gas turbine engine components.</p> <p>(U) Develop and demonstrate an integrated capability for design and manufacture of low-cost composites; demonstrate in situ process control systems; and develop process technologies for cost drivers in military composite structures. (\$6,989K)</p> <p>-- (U) Complete effort to define manufacturing process sensitivities on composite overwrap pressure vessels' performance.</p> <p>-- (U) Continue effort on affordable manufacture of thermoplastic spare parts.</p> <p>(U) Develop and demonstrate process modeling and statistical process control metrics for electronic system components, materials, test, and inspection techniques; develop standard process solutions for military unique modules, sensors, arrays, solar cells, automatic test systems, and devices. (\$9,665K)</p> <p>-- (U) Continue effort to establish a manufacturing process to produce affordable tactical grade fiber optic gyroscopes.</p> <p>-- (U) Continue effort on electronic manufacturing process improvement for low-cost ferrite circulators and for maintenance-free batteries.</p> <p>(U) Develop and demonstrate tools for product exchange and producibility engineering; methodologies for interoperable information systems; and tools that establish the utility and affordability of networked data exchange among prime contractors and suppliers. (\$15,525K)</p> <p>-- (U) Continue effort on methodologies for the use of simulatable specifications for design of complex electronics test.</p> <p>-- (U) Continue effort to provide the tools needed to prepare spare parts procurement packages.</p> <p>(U) Continue pathfinder programs in new areas to validate benefits in flexible manufacturing, commercial-military integration, quality processing, supplier improvements, and integrated product and process development; continue a limited number of industrial base pilot programs which address business policies and practices, manufacturing infrastructure, affordable sustainment of existing systems, application of best commercial manufacturing practices to military products, and affordability of Air Force weapon system (aircraft and missile) components. (\$19,837K)</p> <p>-- (U) Implement the Lean Aircraft Initiative findings in support of Air Force needs.</p> <p>-- (U) Establish integrated sector enterprises within the organic industrial base leveraging on "best practices".</p>		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#3, Advanced Development	PE 0603771F, Industrial Preparedness Manufacturing Technology 2865		
(U) FY 1996:			
- (U)	Develop and demonstrate advanced processes for the manufacture of metals; demonstrate work cells and process maturation which improve precision, yield, and affordability of military hardware and establish repair processes to enable the life extension of high value, aging components and structures. (\$12,404K)		
-- (U)	Establish manufacturing capacity for large welded titanium assemblies for fighter aircraft.		
-- (U)	Demonstrate thin-wall casting manufacturing process leading to product validation.		
- (U)	Develop and demonstrate an integrated capability for design and manufacture of low-cost composites; demonstrate in situ process control systems; and develop process technologies for cost drivers in military composite structures. (\$8,498K)		
-- (U)	Demonstrate rapid manufacture of thermoplastic radomes.		
-- (U)	Validate reproducible and affordable processes for the manufacture of multi-functional structures.		
- (U)	Develop and demonstrate process modeling and statistical process control metrics for electronic system components, materials, test, and inspection techniques; develop standard process solutions for military unique modules, sensors, arrays, solar cells, automatic test systems, and devices. (\$7,785K)		
-- (U)	Continue effort to establish a manufacturing process to produce affordable tactical grade fiber optic gyroscopes.		
-- (U)	Demonstrate electronic manufacturing process improvements for low-cost ferrite circulators and for maintenance-free batteries.		
-- (U)	Initiate manufacturing efforts on multi-bandgap solar cells to complement Phillips Laboratory development effort.		
- (U)	Develop and demonstrate tools for product exchange and producibility engineering; methodologies for interoperable information systems; and tools that establish the utility and affordability of networked data exchange among prime contractors and suppliers. (\$7,580K)		
-- (U)	Continue efforts to develop and demonstrate the methodologies and tools for the capture of tester-independent test requirements.		
-- (U)	Complete effort to provide Air Logistics Centers with the tools needed to prepare spare parts procurement packages.		
- (U)	Continue pathfinder programs in new areas to validate benefits in flexible manufacturing, commercial-military integration, quality processing, supplier improvements, and integrated product and process development; continue a limited number of industrial base pilot programs which address business policies and practices, manufacturing infrastructure, affordable sustainment of existing systems, application of best commercial manufacturing practices to military products, and affordability of Air Force weapon system (aircraft and missile) components. (\$17,065K)		
-- (U)	Continue pilot efforts to demonstrate manufacture of military electronics components on a commercial line.		
-- (U)	Continue effort to implement Lean Aircraft Initiative findings in support of Air Force needs.		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.
#3, Advanced Development	PE 0603771F, Industrial Preparedness Manufacturing Technology 2865	
(U) FY 1997:		
- (U)	Develop and demonstrate advanced processes for the manufacture of metals; demonstrate work cells and process maturation which improve precision, yield, and affordability of military hardware and establish repair processes to enable the life extension of high value, aging components and structures. (\$9,364K)	
-- (U)	Complete effort to simulate the Guerin sheet metal forming process for Air Force Logistics Centers.	
-- (U)	Establish automated repair processes for gas turbine engine components.	
-- (U)	Continue supplier base focused effort to improve quality and reduce the cost of precision investment castings.	
- (U)	Develop and demonstrate an integrated capability for design and manufacture of low-cost composites; demonstrate in situ process control systems; and develop process technologies for cost drivers in military composite structures. (\$4,953K)	
-- (U)	Continue effort on design and manufacture of low-cost composites for engines and wings.	
-- (U)	Demonstrate affordable manufacture of thermoplastic spares.	
- (U)	Develop and demonstrate process modeling and statistical process control metrics for electronic system components, materials, test, and inspection techniques; develop standard process solutions for military unique modules, sensors, arrays, solar cells, automatic test systems, and devices. (\$5,629K)	
-- (U)	Complete effort to establish a manufacturing process to produce affordable tactical grade fiber optic gyroscopes.	
- (U)	Develop and demonstrate tools for product exchange and producibility engineering; methodologies for interoperable information systems; and tools that establish the utility and affordability of networked data exchange among prime contractors and suppliers. (\$7,456K)	
-- (U)	Demonstrate methodologies for the use of simulatable specifications for design of complex electronics test.	
- (U)	Continue pathfinder programs in new areas to validate benefits in flexible manufacturing, commercial-military integration, quality processing, supplier improvements, and integrated product and process development; continue a limited number of industrial base pilot programs which address business policies and practices, manufacturing infrastructure, affordable sustainment of existing systems, application of best commercial manufacturing practices to military products, and affordability of Air Force weapon system (aircraft and missile) components. (\$24,439K)	
-- (U)	Continue pilot efforts to manufacture military products using best commercial practices in defense production facilities.	
-- (U)	Continue effort to establish integrated sector enterprises within the organic industrial base leveraging on "best" practices.	

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	PROJECT NO.
BUDGET ACTIVITY		PE NUMBER AND TITLE	
#3, Advanced Development		PE 0603771F, Industrial Preparedness Manufacturing Technology 2865	
B. (U) Program Change Summary (\$ in Thousands):			
Previous President's Budget	FY 1994	FY 1995	FY 1996
Appropriated Value	0	0	0
Adjustments to Appropriated Value:			
a. Congressional General Reductions	0	84,317	0
Current Budget Submit/President's Budget	0	-1,006	53,332
		83,311	51,841
Change Summary Explanation:			
Funding: In FY 1995, program was submitted as part of a consolidated OSD Program Element, however, funds were appropriated to the Services. This Program Element replaces Manufacturing Technology portion of PE 0708011F, Industrial Preparedness. Funding in FY 1996 reflects only the Air Force core Manufacturing Science and Technology (MS&T) program and does not reflect Congressional interest programs from FY 1995.			
Schedule: Not Applicable.			
Technical: Not Applicable.			
Total Cost			
			0
			Cont
			Cont
			Cont
			Cont

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE PE 0603771F, Industrial Preparedness Manufacturing Technology 2865	PROJECT NO.
<p>#3, Advanced Development</p> <p>C. (U) <u>Other Program Funding Summary:</u></p> <p>(U) <u>Related Activities:</u></p> <ul style="list-style-type: none"> - (U) PE 0602102F, Materials. - (U) PE 0708045A, Manufacturing Science and Technology. - (U) PE 0708011N, Industrial Preparedness. - (U) PE 0708011S, Industrial Preparedness. - (U) PE 0708054F, Pollution Prevention. - (U) PE 0603716D, Environmental. - (U) PE 0603112F, Advanced Materials for Weapon Systems. - (U) PE 0708011F, Industrial Base Preparedness. - (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication. <p>D. (U) <u>Schedule Profile:</u> Not Applicable.</p>		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE									
#3, Advanced Development		PE 0603789F, Command, Control, and Communications (C3) Advanced Development									
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Total PE 0603789F Cost	9,073	10,691	12,617	11,179	13,466	14,044	14,577	16,668	Cont	Cont	
Project 2335, Advanced C3 Technology	3,885	4,721	5,311	5,313	6,013	6,114	6,300	7,400	Cont	Cont	
Project 4072, Correlation and Fusing	5,188	5,970	7,306	5,866	7,453	7,930	8,277	9,268	Cont	Cont	

A. (U) Mission Description and Budget Item Justification: This Advanced Development program demonstrates ground and aerospace C3 technology required to maintain Air Force capabilities in a fast-paced, sophisticated, high threat, and intense jamming environment. Enhanced surveillance and communications technology must be developed to counteract an enemy's jamming and to restore critical communications links to the warfighter. The technologies developed in this program include: detection, identification, and tracking of hostile targets at long ranges under combat conditions; reliable, secure, jam resistant communications; and battle management technology that assimilates crucial C3 information into a form which facilitates and supports the military leader's combat decisions in response to the dynamics of the battlefield. All efforts in this program element contain the resources necessary, including civilian salaries, to manage, conduct, and document the technical activities.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE		February 1995
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BUDGET ACTIVITY

PE NUMBER AND TITLE

#3, Advanced Development

PE 0603789F, Command, Control, and Communications (C3)
Advanced DevelopmentB. (U) Program Change Summary (\$ in Thousands):

Previous President's Budget	FY 1994	FY 1995	FY 1996	FY 1997	Total
Appropriated Value	8,673	9,925	16,180	19,140	Cost
Adjustments to Appropriated Value:	8,900	10,925			Cont
a. Congressional General Reductions	-227	-234			
b. SBIR	-100				
c. Below Threshold Reprogramming	500				
Current President's Budget	9,073	10,691	12,617	11,179	Cont

Change Summary Explanation:

Funding: Increases from FY 1995 to FY 1996 are to conduct key enhanced surveillance and communications demonstrations for the user. This technology directly supports the Joint Chiefs of Staff Future Joint Warfighting Capability: "To maintain near perfect real-time knowledge of the enemy and communicate that to all forces in near-real-time."

Schedule: Not Applicable.

Technical: Not Applicable.

C. (U) Other Program Funding Summary: Not Applicable.D. (U) Schedule Profile: Not Applicable.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#3, Advanced Development		PE 0603789F, Command, Control, and Communications (C3) Advanced Development								2335	
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Project 2335, Advanced C3 Technology	3,885	4,721	5,311	5,313	6,013	6,114	6,300	7,400	Cont	Cont	
<p>A. (U) <u>Mission Description and Budget Item Justification:</u> This program develops C3 technology for contingency and joint operations focusing on the concepts of force deployment, sustainment, and employment. Dynamic, extremely hostile battlefield environments demand near instantaneous transmission and processing of vast amounts of C3 information for real-time decision making. This project develops and integrates: low probability of intercept/anti-jam information and data processing; modular, programmable, multi-level secure communications; secure and distributed networks; advanced displays and interfaces; and battle management decision support capabilities for survivable, distributed C3 facilities. Multiband/multimode programmable radios will be enhanced to address the transmission link requirements of joint combat theater communications.</p> <p>(U) FY 1994:</p> <ul style="list-style-type: none"> - (U) Developed and demonstrated critical ground and aerospace communications technology advances in programmable devices and monolithic microwave integrated circuits to provide survivable radios and transceivers. (\$1,935K) - (U) Performed initial Phase 1 of the SPEAKEASY multiband, multimode programmable radio technology demonstration using an Army SINGARS and an Air Force HAVE QUICK operational wave form generator; using only algorithm modifications, SPEAKEASY demonstrated secure voice communications of Army-to-Army, Air Force-to-Air Force, and Army-to-Air Force systems at fixed frequencies, dissimilar frequencies, and while each system used frequency hopping techniques over separate and overlapping wave bands. - (U) Integrated the Quad-C40 multichip coprocessor module and a brassboard programmable secure information device into the SPEAKEASY programmable radio advance development model for multimode and multiband operational demonstration. - (U) Demonstrated distributed processing technologies to provide efficient, secure, interoperable, and deployable communications systems. (\$850K) - (U) Installed six (6) asynchronous transfer switching nodes at Air Force, Army, Navy, and Defense Information Systems Agency sites and continued information management/control technology development. - (U) Developed and demonstrated theater battle management and time-critical air operations technologies to provide field commanders essential operational decision support and rapid response capabilities. (\$1,100K) - (U) Completed force level execution decision support system and transitioned it to the user's operational advanced planning tool. - (U) Generated concept design and development plan for an integrated operations and surveillance capability to enhance real-time mission planning. 											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

#3, Advanced Development

PE 0603789F, Command, Control, and Communications (C3)
Advanced Development 2335

(U) FY 1995:

- (U) Develop and demonstrate critical ground and aerospace communications technology advances in programmable devices and monolithic microwave integrated circuits to provide survivable radios and transceivers. (\$3,000K)
- (U) Conduct final testing of Phase 1 SPEAKEASY programmable radio advanced development models employing technology insertion modules to demonstrate programmability and interoperability with existing legacy radios.
- (U) Develop preliminary Phase 2 SPEAKEASY reprogrammable, multiband, multimode radio design for joint forces application.
- (U) Demonstrate distributed processing technologies to provide efficient, secure, interoperable, and deployable communications systems. (\$460K)
- (U) Develop advanced switching technology brassboard with system management/control capabilities for a Joint-Service demonstration.
- (U) Conduct preliminary design phase of a survivable asynchronous switch, focusing on the development of a family of integrated multi-level secure tactical switches.
- (U) Demonstrate theater battle management and time-critical air operations technologies to provide field commanders essential operational decision support and rapid response capabilities. (\$1,261K)
- (U) Complete operations and surveillance integration concept design plan development.
- (U) Conduct preliminary computational configuration design analysis needed for the first operations and surveillance integration brassboard.
- (U) Develop a concept plan to define approaches for operational advanced planning tool processes which employ information management technology.

(U) FY 1996:

- (U) Develop and demonstrate critical ground and aerospace communications technology advances in programmable devices and monolithic microwave integrated circuits to provide survivable radios and transceivers. (\$3,000K)
- (U) Establish Phase 2 SPEAKEASY programmable radio architecture and modular definition supporting development of a reprogrammable, multiband, multimode capability.
- (U) Demonstrate Phase 2 SPEAKEASY programmable radio man-machine interface compatibility with existing user radios and capability to support future requirements.
- (U) Demonstrate distributed processing technologies to provide efficient, secure, interoperable, and deployable communications networks. (\$550K)
- (U) Revise the tactical switch low-rate interface module specifications, develop protocols, and test for survivable operation.
- (U) Complete design, development, and testing of translation interface between tactical and commercially compatible switches to support operational voice user requirements.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE February 1995
BUDGET ACTIVITY #3, Advanced Development	PE NUMBER AND TITLE PE 0603789F, Command, Control, and Communications (C3) Advanced Development	PROJECT NO. 2335
<ul style="list-style-type: none"> - (U) Demonstrate theater battle management and time-critical air operations technologies to provide field commanders essential operational decision support and rapid response capabilities. (\$1,761K) -- (U) Complete the first brassboard operations and surveillance integration design and demonstrate it; develop a concept design for the second operations and surveillance integration brassboard. -- (U) Develop functional and technical analyses leading to a system/segment specification for use in advanced planning tools. <p>(U) <u>FY 1997:</u></p> <ul style="list-style-type: none"> - (U) Develop and demonstrate critical ground and aerospace communications technology advances in programmable devices and monolithic microwave integrated circuits to provide survivable radios and transceivers. (\$3,000K) -- (U) Demonstrate compatibility between the limited capacity, preliminary brassboard Phase 2 SPEAKEASY programmable radio development module with legacy military radio wave forms. -- (U) Demonstrate information routing between military radios using Phase 2 SPEAKEASY programmable radio module. - (U) Demonstrate distributed processing technologies to provide efficient, secure, interoperable, and deployable communications systems. (\$1,000K) -- (U) Develop, integrate, and test field management system survivability and security features in an existing standards-based management platform system. -- (U) Establish baseline management system requirements for military quality-of-service, survivability, and performance. -- (U) Develop a standard peer management system interface allowing seamless interoperation with other standards-based military and commercial systems. - (U) Demonstrate theater battle management and time-critical air operations technologies to provide field commanders essential operational decision support and rapid response capabilities. (\$1,313K) -- (U) Complete designs and demonstration of operations and surveillance integration brassboards #2 and #3; complete preliminary/final acceptance test and host the operations and surveillance integration brassboard technology demonstration to the user. -- (U) Develop concept plan for developing defensive advanced planning technology brassboard; create brassboard development algorithm design document. 		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE		PROJECT NO.	
February 1995		2335	
BUDGET ACTIVITY		PE NUMBER AND TITLE	
#3, Advanced Development		PE 0603789F, Command, Control, and Communications (C3) Advanced Development	
B. (U) <u>Program Change Summary (\$ in Thousands):</u>			
Previous President's Budget	FY 1994	FY 1995	FY 1996
Current President's Budget	3,685	4,855	6,815
	3,885	4,721	5,311
			FY 1997
			7,505
			5,313
			Total
			Cost
			Cont
			Cont
Change Summary Explanation:			
Funding: Increases from FY 1995 to FY 1996 are to conduct key enhanced surveillance and communications demonstrations for the user. This technology directly supports the Joint Chiefs of Staff Future Joint Warfighting Capability: "To maintain near perfect real-time knowledge of the enemy and communicate that to all forces in near-real-time."			
Schedule: Not Applicable.			
Technical: Not Applicable.			
C. (U) <u>Other Program Funding Summary:</u>			
(U) <u>Related Activities:</u>			
- (U) PE 0603617F, C3 Applications.			
- (U) PE 0603737D, Advanced Research Projects Agency.			
- (U) PE 0603006A, C3 Technology.			
- (U) PE 0602702F, C3.			
- (U) PE 0602232N, C3 Technology.			
- (U) PE 0603726F, C3 Subsystems Integration.			
- (U) PE 0603728F, Advanced Computer Technology.			
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.			
D. (U) <u>Schedule Profile:</u> Not Applicable.			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#3, Advanced Development		PE 0603789F, Command, Control, and Communications (C3) Advanced Development								4072	
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Project 4072, Correlation and Fusing	5,188	5,970	7,306	5,866	7,453	7,930	8,277	9,268	Cont	Cont	
<p>A. <u>Mission Description and Budget Item Justification:</u> The Air Force must be able to detect, positively identify, and track hostile targets in combat to gain maximum advantage of all strategic and tactical warning sensors and beyond-visual-range weapons to ensure maximum target engagement ranges and a first-shot, first-kill capability. Effective sensor processing improvements using advanced open architecture processors, spatial coordinate and time adaptive processing techniques, tracking/fusion algorithms, bistatic sensor technology, and correlation techniques will be pursued to enhance target detection and tracking ranges. Indirect hostile target identification capabilities are essential to achieve high-confidence identification to control the air battle and provide the warfighter with the necessary information to use beyond-visual-range weapons. This project develops and integrates the necessary suite of complementary passive and active hostile target identification capabilities for command and control platforms. These technologies will enhance the performance of identification and threat assessment systems for enhanced acquisition, tracking, and target engagement ranges for theater operations.</p> <p>(U) <u>FY 1994:</u></p> <ul style="list-style-type: none"> - (U) Developed high-confidence hostile airborne target identification and tracking technologies and concepts. (\$1,888K) - (U) Integrated Rome Laboratory surveillance and intelligence facility assets in order to enhance target identification experiments; developed advanced algorithms for passive identification of air targets using bistatic radar. - (U) Developed advanced fusion algorithms to improve tracking and identification attributes. - (U) Developed and demonstrated advanced sensor technologies and concepts for assured detection and tracking of hostile ground targets using multiple off-board sensors. (\$3,300K) - (U) Developed off-board cueing methodologies. - (U) Completed algorithm sizing for real-time correlation; demonstrated on an operational surveillance platform. <p>(U) <u>FY 1995:</u></p> <ul style="list-style-type: none"> - (U) Develop high-confidence hostile airborne target identification and tracking technologies and concepts. (\$2,470K) - (U) Complete development of track and identification fusion capability and begin experiments using laboratory assets and targets; conduct first stage installation of multi-sensor integration algorithm on an operational surveillance platform for FY 1997 demonstration testing. - (U) Develop passive techniques to exploit intelligence data to identify hostile air targets. - (U) Develop advanced tracking algorithms for surveillance using advanced radar processing techniques to improve target tracking and new concepts that determine target position, direction, and altitude. 											

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE PE 0603789F, Command, Control, and Communications (C3) Advanced Development	PROJECT NO. 4072
<p>#3, Advanced Development</p> <ul style="list-style-type: none"> - (U) Develop and demonstrate advanced passive sensor technologies and concepts for increased survivability of fielded systems and assured detection and tracking of combat threats. (\$200K) -- (U) Conduct first stage development of advanced bistatic tracking algorithm and preliminary testbed design. - (U) Develop and demonstrate advanced sensor technologies and concepts for assured detection and tracking of hostile ground targets using multiple off-board sensors. (\$2,300K) -- (U) Implement enhanced surveillance algorithms, using off-board sensor inputs, in a workstation environment; develop assessment/exit criteria. -- (U) Evaluate parallel processing architecture performance and define requirements for incorporating: sensor management; enhanced surveillance algorithms, using off-board sensor inputs; synthetic aperture radar; and inverse algorithmic capabilities. -- (U) Complete real-time on-board sensor management algorithm architecture development for the allocation of resources using an advanced computer system. - (U) Conduct technology demonstration on decision support technology. (\$1,000K) <p>(U) <u>FY 1996:</u></p> <ul style="list-style-type: none"> - (U) Develop high-confidence hostile airborne target identification and tracking technologies and concepts. (\$3,520K) -- (U) Install multi-sensor integration algorithm on an operational surveillance platform for FY 1997 demonstration testing. -- (U) Complete advanced surveillance tracking algorithms utilizing advanced radar processing techniques to improve target tracking and the incorporation of new concepts that determine target attitude (position, direction, altitude). -- (U) Investigate methods to incorporate advances in cueing technology using a distributed architecture to perform real-time target identification. - (U) Develop and demonstrate advanced passive sensor technologies and concepts for increased survivability of fielded systems and assured detection and tracking of combat threats. (\$985K) -- (U) Integrate hardware, computational methods, and detection/tracking algorithms into an advanced multichannel passive sensor testbed supporting bistatic system performance evaluation and future airborne test risk reduction efforts. 		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.
#3, Advanced Development	PE 0603789F, Command, Control, and Communications (C3) Advanced Development	4072
<ul style="list-style-type: none"> - (U) Develop and demonstrate advanced sensor technologies and concepts for assured detection and tracking of hostile ground targets using multiple off-board sensors. (\$2,801K) -- (U) Demonstrate multiple observation and information platform data fusion using enhanced surveillance algorithms (based on off-board sensor inputs) and operating in a workstation environment to detect, track, and identify targets with data from existing surveillance platforms. -- (U) Assess detection, track, and fusion enhancement gains via real-time laboratory demonstration, defining the radar processing elements and fusion requirements to support real-time parallel processing. -- (U) Develop and test 20-billion-operations-per-second real-time signal processor enhancement Standard Electronic Module - E (SEM-E) format board required to demonstrate real-time high resolution processing. <p>(U) FY 1997:</p> <ul style="list-style-type: none"> - (U) Develop and demonstrate advanced sensor technologies and concepts for assured detection and tracking of hostile airborne targets using multiple off-board sensors. (\$2,550K) -- (U) Complete installation of multi-sensor integration algorithm on an operational surveillance platform and demonstrate on-board and off-platform sensor fusion and integration. -- (U) Develop automated tools built upon knowledge-based systems incorporating operator experience and advanced cueing theory techniques to minimize airborne target identification time. - (U) Develop and demonstrate advanced passive sensor technologies and concepts for increased survivability of fielded systems and assured detection and tracking of combat threats. (\$654K) -- (U) Demonstrate the advanced, multichannel passive sensor testbed capability to identify range, band width, coherency, receiver channel matching/calibration, array multipath effects, and integration issues in order to reduce technical risks of future technology demonstrations. - (U) Develop and demonstrate advanced sensor technologies and concepts for assured detection and tracking of hostile ground targets using multiple off-board sensors. (\$2,662K) -- (U) Complete the evaluation of real-time parallel processing enhancements assessments of cueing and correlation to operational systems. -- (U) Conduct field test and demonstration of real-time signal processor enhancement hardware running enhanced synthetic aperture radar and inverse algorithms on an operational systems testbed. 		

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

#3, Advanced Development

PE 0603789F, Command, Control, and Communications (C3)
Advanced Development 4072B. (U) Program Change Summary (\$ in Thousands):Previous President's Budget
Current President's BudgetFY 1994
4,988
5,188FY 1995
5,070
5,970FY 1996
9,365
7,306FY 1997
11,635
5,866Total
Cost
Cont
Cost

Change Summary Explanation:

Funding: Increases from FY 1995 to FY 1996 are to conduct key enhanced surveillance and communications demonstrations for the user. This technology directly supports the Joint Chiefs of Staff Future Joint Warfighting Capability: "To maintain near perfect real-time knowledge of the enemy and communicate that to all forces in near-real-time."

Schedule: Not Applicable.

Technical: Not Applicable.

C. (U) Other Program Funding Summary:(U) Related Activities:

- (U) PE 0603203F, Advanced Avionics for Aerospace Vehicles.
- (U) PE 0602702F, C3.
- (U) PE 0603742F, Combat Identification Technology.
- (U) PE 0603726F, C3 Subsystems Integration.
- (U) PE 0603728F, Advanced Computer Technology.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

D. (U) Schedule Profile: Not Applicable.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	
BUDGET ACTIVITY										February 1995	
4 - Demonstration & Validation		PE NUMBER AND TITLE									
		#0603800F Joint Advanced Strike Technology (JAST) Program									
	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
COST (\$ in Thousands)											
Total Program Element (PE) Cost	0	83,801	151,186	199,831	304,263	413,616	196,967	0	0	1,349,664	
Project Number 2025 Total Cost	0	83,801	151,186	199,831	304,263	413,616	196,967	0	0	1,349,664	
<p>A. Mission Description and Budget Item Justification</p> <p>(U) The Joint Advanced Strike Technology (JAST) Program has been chartered to facilitate the evolution of fully-validated affordable operational requirements and proven operational concepts, and also transition the key technologies to enable the successful development and production of affordable next-generation strike aircraft weapon systems for the Air Force, Navy, Marine Corps, and our allies. The JAST Program is a joint program with no executive service. Air Force and Navy each provide approximately equal shares of annual funding for the program effective in FY 1995. The Advanced Research Projects Agency (ARPA) contributes funding for the concept flight demonstration effort commencing in FY 1996.</p> <p>(U) FY 1994 Accomplishments - Conducted concept exploration studies and provided in-house support as follows (Navy only funding in FY 1994 -- \$29,663):</p> <ul style="list-style-type: none"> - (U) (\$11,597) Strike warfare concept studies. - (U) (\$5,935) Program operations support, including program office functions. - (U) (\$5,049) Strategy-to-technology analysis. - (U) (\$2,017) Supportability. - (U) (\$1,570) Flight Systems. - (U) (\$1,000) Propulsion. - (U) (\$988) Avionics. - (U) (\$704) Weapons integration. - (U) (\$439) Technology integration planning support. - (U) (\$259) Structure and materials. - (U) (\$105) Manufacturing. 											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE February 1995
BUDGET ACTIVITY 4 - Demonstration & Validation	PE NUMBER AND TITLE #0603800F Joint Advanced Strike Technology (JAST) Program	
A. <u>Mission Description and Budget Item Justification (cont.)</u>		
<p>(U) FY 1995 Plans - Complete concept exploration, begin concept development, and provide in-house support as follows:</p> <p>(Reflects combined Air Force & Navy funding -- total \$182,073.)</p> <ul style="list-style-type: none"> - (U) (\$55,670) Strike warfare systems design development. - (U) (\$37,819) Advanced Short Take Off and Vertical Landing (ASTOVL). - (U) (\$18,622) Avionics. - (U) (\$17,754) Propulsions. - (U) (\$10,150) Flight Systems. - (U) (\$9,837) Structures and Materials. - (U) (\$7,410) Strategy-to-technology analysis. - (U) (\$7,247) Weapons integration. - (U) (\$6,325) Program operations, including program office functions. - (U) (\$5,017) Supportability. - (U) (\$4,973) Manufacturing and Producibility. - (U) (\$1,249) Technology integration planning support. <p>(U) FY 1996 Plans - Continue concept development, begin advanced aircraft concept demonstrations, and provide in-house support as follows: (Reflects combined Air Force, Navy, and Advanced Research Projects Agency (ARPA) funding -- total \$331,156)</p> <ul style="list-style-type: none"> - (U) (\$77,058) Concept flight demonstration efforts. - (U) (\$56,284) Strike warfare systems design development. - (U) (\$36,096) Avionics. - (U) (\$33,488) Propulsion. - (U) (\$31,200) Flight Systems. - (U) (\$25,054) Structures and Materials. - (U) (\$20,000) Supportability. 		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE
BUDGET ACTIVITY	PE NUMBER AND TITLE	February 1995
4 - Demonstration & Validation	#0603800F Joint Advanced Strike Technology (JAST) Program	
A. Mission Description and Budget Item Justification (cont.)		
<p>(U) FY 1996 Plans - Continue concept development, begin advanced aircraft concept demonstrations, and provide in-house support as follows: (Reflects combined Air Force, Navy, and ARPA funding.) (cont.)</p> <ul style="list-style-type: none"> - (U) (\$17,300) Weapons integration. - (U) (\$12,000) Manufacturing and Producibility. - (U) (\$7,639) Strategy-to-technology analysis. - (U) (\$6,983) Program operations, including program office functions. - (U) (\$6,900) Advanced Short Take-Off and Vertical Landing (ASTOVL). - (U) (\$1,154) Technology integration planning support. <p>(U) FY1997 Plans - Continue advanced aircraft concept demonstrations and provide in-house support as follows: (reflects combined Air Force, Navy, and ARPA funding -- total \$480,061.)</p> <ul style="list-style-type: none"> - (U) (\$193,580) Concept flight demonstrations. - (U) (\$66,450) Structures and Materials. - (U) (\$60,000) Propulsion. - (U) (\$55,000) Avionics. - (U) (\$31,900) Flight Systems. - (U) (\$23,900) Supportability. - (U) (\$22,700) Weapons integration. - (U) (\$11,000) Manufacturing and Producibility. - (U) (\$7,600) Strategy-to-technology analysis. - (U) (\$6,777) Program operations support. - (U) (\$1,154) Technology integration planning support. 		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)			DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE			
4 - Demonstration & Validation	#0603800F Joint Advanced Strike Technology (JAST) Program			
B. Program Change Summary (\$ in Thousands).				
	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>
(U) Previous President's Budget	0	101,354	151,975	200,860
(U) Appropriated Value	0*	86,354		
(U) Adjustments to Appropriated Value				
(U) a. General Reductions		-1,096		
(U) b. SBIR		-1,457		
(U) Adjustments to Budget Years Since FY 1995 PB			-789	-1,029
(U) Current Budget Submit/President's Budget	0*	83,801	151,186	199,831
				1,349,664
(U) Change Summary Explanation:				
(U) Funding: FY 1995 adjustments include General Reductions of: non-FFRDC; FFRDC; Univ. Research; Travel. FY 1996 & 1997 adjustments are due to lower inflation projections.				
(U) Schedule: Not applicable.				
(U) Technical: Not applicable.				
 (U) * \$30,000 was appropriated for the Navy to initiate JAST Program; FY1995 PB reflected \$29,663 for Navy.				

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

February 1995

PE NUMBER AND TITLE

#0603800F Joint Advanced Strike Technology (JAST) Program

(U) JAST is a joint program with no executive service. Air Force and Navy each provide approximately equal shares of annual funding for the program effective in FY1995. ARPA contributes funding for the concept flight demonstration effort commencing in FY 1996.

(U) PE# 0603800N

(U) PE# 0603800E

(U) PE# 0604800F*

(U) PE# 0604800N *

* Milestone II for a joint follow-on EMD program for the next generation strike aircraft weapon system(s) is planned in F/Y 2000. The follow-on aircraft weapon system(s) program will develop a family of aircraft from concepts proven under the JAST Program, incorporating affordable technologies transitioned from the JAST Program.

	1994	1995	1996	1997	1998	1999	2000	2001	To Compl	Total Cost
--	------	------	------	------	------	------	------	------	-------------	---------------

	29,663	98,272	149,295	199,305	292,426	409,349	196,921	0	1,375,231
	0	0	30,675	80,925	83,922	19,000	16,000	10,000	CONT CONT

29,663	98,272	149,295	199,305	292,426	409,349	196,921	0	1,375,231
0	0	30,675	80,925	83,922	19,000	16,000	10,000	CONT
								CONT

CONT	0	0	0	0	0	127,324	464,441	CONT
CONT	0	0	0	0	0	127,295	464,456	CONT

CONT	0	0	0	0	0	127,324	464,441	CONT
CONT	0	0	0	0	0	127,295	464,456	CONT

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE											
4 - Demonstration & Validation		#0603800F Joint Advanced Strike Technology (JAST) Program											
D. <u>Schedule Profile</u>													
		1994		1995		1996		1997					
		1	2	3	4	1	2	3	4	1	2	3	4
(U) Acquisition Milestones: Not applicable; not an acquisition program.													
(U) Engineering Milestones: Not applicable; not an acquisition program.													
(U) T & E Milestones: Not applicable; not an acquisition program.													
(U) Contract Milestones: Not applicable; not an acquisition program.													
(U) Other Program Events:													
Concept Exploration (May 94 - Nov 94)				X									
* Concept Development (Dec 94 - mid-96)													
** Concept Demonstration (mid-96 - 2000)												X	
(U) Transition to joint follow-on Engineering and Manufacturing Development (EMD) program with Milestone II (FY 2000).													
(U) Continue technology maturation demonstration/transition under the JAST Program.													
* Concept Development (Definition and Design Research)													
** Concept Demonstration (includes Flying Concept Demonstrations)													

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)			
BUDGET ACTIVITY	PE NUMBER AND TITLE	DATE	
		February 1995	PROJECT NO.
4 - Demonstration & Validation	#0603800F Joint Advanced Strike Technology (JAST) Program	2025	
<p>A. <u>Project Cost Breakdown (\$ in Thousands)</u></p> <p>(U) The JAST Program is a joint program with no lead service. Air Force and Navy have each budgeted approximately equal shares of annual funding effective in FY 1995. ARPA contributes funding for the concept flight demonstration effort commencing in FY 1996. Funding resource breakdown is provided following project cost breakdown.</p>			
		<u>1994</u>	<u>1995</u>
Strike warfare concept studies		11,597	<u>1996</u>
Strike warfare systems design development			<u>1997</u>
Concept flight demonstrations			193,580
ASTOVL			
Strategy-to-technology analysis		5,049	7,600
Structures and materials		259	66,450
Flight Systems		1,570	31,900
Manufacturing		105	
Manufacturing and producibility			11,000
Propulsion		1,000	60,000
Avionics		988	55,000
Weapons integration		704	22,700
Supportability		2,017	23,900
Technology integration planning support		439	1,154
Program Operations support		5,935	6,777
Total		29,663	480,061
		182,073	331,156

* Cost breakdown summary reflects combined Air Force, Navy and ARPA funding.

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February 1995
BUDGET ACTIVITY		PROJECT NO.	
4 - Demonstration & Validation	PE NUMBER AND TITLE	#0603800F Joint Advanced Strike Technology (JAST) Program 2025	
A. <u>Project Cost Breakdown (\$ in Thousands) (cont.)</u>			
* Funding Resources	FY 1994	FY 1995	FY 1996
(U) Air Force PE#0603800F	0	83,801	151,186
(U) Navy PE#0603800N	29,663	98,272	149,295
(U) ARPA PE#0603800E	0	0	30,675
(U) Total	29,663	182,073	331,156
B. <u>Budget Acquisition History and Planning Information:</u> Not applicable.			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE									
#4 Demonstration & Validation		#0603851F ICBM Modernization Dem/Val									
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Total Program Element (PE) Cost	2,504	17,877	20,265	30,638	38,502	42,419	44,152	45,091	LOE	LOE	
1020 ICBM Guidance Applications	0	11,870	11,544	17,216	19,604	19,604	20,099	20,094	LOE	LOE	
1021 ICBM Propulsion Applications	0	301	200	200	200	200	200	200	LOE	LOE	
1022 ICBM Reentry Vehicle Applications	0	2,200	5,673	10,549	15,723	19,704	20,994	21,785	LOE	LOE	
1023 Rocket System Launch Program*	0	0	30	31	31	32	34	36	LOE	LOE	
1024 ICBM Command & Control Applications	0	301	200	200	200	200	200	200	LOE	LOE	
4209 Long Range Planning**	2,504	3,205	2,618	2,442	2,744	2,679	2,625	2,776	LOE	LOE	
A. (U) Mission Description and Budget Item Justification											
(U) Efforts identify methods to reduce life cycle costs, improve nuclear safety and surety, support international arms control agreements, and ensure Minuteman III supportability. Program includes demonstration and validation of Minuteman III guidance options, independent assessment of stage IV supportability, feasibility study of future warhead safety options, and enhancements to survivable command and control capabilities. These programs are in Budget Activity/Research Category Demonstration and Validation and these programs integrate existing technologies and reduce life cycle costs.											
*FY95 funds reported and executed under PE 65860F, Rocket Systems Launch Program											
**FY94 and Prior Year funds were appropriated in PE 11213F, Minuteman Squadrons.											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE		
#4 Demonstration & Validation	#0603851F ICBM Modernization Dem/Val		
B. (U) <u>Program Change Summary (\$ in Thousands)</u>			
Previous President's Budget*	1994	1995	1996
Appropriated Value	16,336	36,018	42,830
Adjustments to Appropriated Value		43,206	
Congressional Reductions		-603	
SBIR		-899	
New RSLP PE**		-23,827	
Adjustments to Budget Years Since FY95 PB			
Current Budget Submit/President's Budget*	2,504	17,877	-22,565
			20,265
			-7,962
			30,638
			LOE
*FY94 and Prior Year funds were appropriated in PE 11213F, Minuteman Squadrons; FY95 and out years previously budgeted in PE 11213F (Minuteman Squadrons) and PE 0603308 (Strategic Missile Modifications)			
**FY95 funds (\$23,827) reported under PE 65860F, Rocket Systems Launch Program			
Change Summary Explanation:			
(U) Funding: Funding changed as a result of realignment to fund new PEs per congressional direction. Funding adjustments still support NPR recommendations and sustain the Reentry Vehicle industrial base.			
(U) Schedule: N/A			
(U) Technical: N/A			
C. (U) <u>Other Program Funding Summary (\$ in Thousands)</u>			
	1994	1995	1996
	1997	1998	1999
	2000	2001	To
			Compl
			Total
			Cost
Military Construction (PE 035119F)	7,250		
(for Minuteman II Storage)			7,250

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#4 Demonstration & Validation		#0603851F ICBM Modernization Dem/Val								1020	
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
ICBM Guidance Applications	0	11,870	11,544	17,216	19,604	19,604	20,099	20,094	LOE	LOE	
A. (U) <u>Mission Description and Budget Item Justification (\$ in Thousands)</u> ICBM Guidance Application efforts implement the JROC-validated Mission Need Statement for Future Guidance Systems for Intercontinental Ballistic Missiles. The program is a compilation of government and contractor efforts focused on implementing disengagement strategies as directed by national security planning agencies, significantly reducing guidance system life cycle cost, increasing nuclear surety, and evaluating/demonstrating the guidance instrument options that will keep the Minuteman III viable. This program also implements the Nuclear Posture Review recommendations to preserve guidance instrument technologies. Guidance Applications projects will demonstrate the utility and/or cost reduction potential of technologies applied to the Minuteman guidance system.											
(U) <u>FY 1994</u> - Not applicable											
(U) <u>FY 1995</u>											
- (U) Support the Advanced Inertial Measurement System (AIMS) through the completion of dem/val of brassboard testing. (\$10,000)											
- (U) Perform Alternatives and Effectiveness study. (\$685)											
- (U) Perform Reliability Analysis Study of IMU viability for dormant operations including start-up reliability. (\$590)											
- (U) Guidance Replacement Program (GRP) contractor support to evaluate integration of alternative advanced IMUs with GRP. (\$595)											
(U) <u>FY 1996</u>											
(U) Conduct gyros design and develop brassboard prototype. (\$1,444)											
(U) Design replacement accelerometer and develop prototype. (\$1,100)											
(U) Begin development of prototype IMU and design Gyro Compass Assembly (GCA) (\$7,400)											
(U) Perform guidance component aging prediction study. (\$300)											
(U) Begin developing IMU replacement components. (\$1,300)											
(U) <u>FY 1997</u>											
(U) Continue design and development of prototype gyros. (\$2,116)											
(U) Continue accelerometer development. (\$1,700)											
(U) Continue development of prototype IMU and complete GCA design. (\$11,500)											
(U) Complete aging study and begin methodology assessment. (\$500)											
(U) Continue development of IMU replacement components and assess repair technology. (\$1,400)											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995		
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.			
#4 Demonstration & Validation	#0603851F ICBM Modernization Dem/Val	1020			
B. (U) <u>Program Change Summary (\$ in Thousands)</u>					
Previous President's Budget	1994 0	1995 12,650	1996 22,593	1997 21,593	Total Cost LOE
Appropriated Value		12,650			
Adjustments to Appropriated Value					
Congressional Reductions		-380			
SBIR		-400			
Adjustments to Budget Years Since FY95 PB			-11,049	-4,377	
Current Budget Submit/President's Budget	0	11,870	11,544	17,216	LOE
Change Summary Explanation:					
(U) Funding: Funding in FY96 and beyond reduced but still supports NPR recommendations.					
(U) Schedule: AIMS brassboard testing scheduled for 4Qtr FY95.					
(U) Technical: N/A					
C. (U) <u>Other Program Funding Summary (\$ in Thousands):</u> Not Applicable.					
<u>Related RDT&E:</u> PE 0605851F (ICBM Modernization EMD)					
D. (U) <u>Schedule Profile</u>					
	1	2	3	4	1994
					1995
					1996
					1997
AIMS Demonstration/Validation	X				
Perform alternative study					
Conduct Reliability Analysis of NS-20/50					
Perform aging study					
Hardware design and development					

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#4 Demonstration & Validation	#0603851F ICBM Modernization Dem/Val	1020	
A. (U) <u>Project Cost Breakdown (\$ in Thousands)</u>			
		<u>1994</u>	<u>1995</u>
Program Management Support		0	593
Contract Systems Engineering		0	11,277
Total		0	11,870
B. (U) <u>Budget Acquisition History and Planning Information (\$ in Thousands):</u>			
(U) Performing Organizations: N/A			
(U) Government Furnished Property: N/A			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY				PE NUMBER AND TITLE						PROJECT NO.			
#4 Demonstration & Validation				#0603851F ICBM Modernization Dem/Val						1021			
COST (\$ in Thousands)				FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
ICBM Propulsion Applications				0	301	200	200	200	200	200	200	LOE	LOE
<p>A. (U) <u>Mission Description and Budget Item Justification (\$ in Thousands)</u></p> <p>(U) PSRE: The Minuteman III post boost vehicle, Propulsion System Rocket Engine (PSRE), is out of production and is a major Minuteman III component which is required through the life of the weapon system. In order to ensure that the PSRE will satisfy operational requirements, special testing, research, risk analyses, and engineering analysis are required for the evaluation of the components. Reuse studies and/or development of replacement hardware will be required which will include feasibility evaluations, technology improvements, material processing validation and manufacturing validation.</p> <p>(U) Minuteman Ordnance: The igniter safe and arm, arm/disarm switch and interstage skirt jettison ordnance must be replaced or overhauled to support the weapon system life objectives. Component reuse, environmental issues and supportability/produceability issues will be addressed to enable new production of these assemblies. The remanufactured assets from this effort are also required to support motor Change Verification Motor, Qual, and Flight Test Motor testing.</p> <p>(U) <u>FY 1994</u> - Not applicable</p> <p>(U) <u>FY 1995</u></p> <p>- (U) PSRE: Conduct fired PSRE reuse study. (\$197)</p> <p>- (U) PSRE: Conduct independent assessment of PSRE and study options to meet Minuteman III post boost vehicle requirements. (\$104)</p> <p>(U) <u>FY 1996</u> -</p> <p>(U) PSRE: Conclude independent assessment of PSRE and study of options to meet Minuteman III post boost vehicle requirements. (\$98K)</p> <p>(U) PSRE: Conduct fired PSRE reuse study. (\$52)</p> <p>(U) Ordnance: Conduct component reuse studies for life extension. (\$50)</p> <p>(U) <u>FY 1997</u> -</p> <p>(U) PSRE: Conduct component reuse studies for life extension. (\$98)</p> <p>(U) PSRE: Conduct fired PSRE reuse study. (\$52)</p> <p>(U) Ordnance: Conduct component reuse studies for life extension. (\$50)</p>													

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Exhibit R-2

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.
#4 Demonstration & Validation	#0603851F ICBM Modernization Dem/Val	1021
A. (U) <u>Project Cost Breakdown (\$ in Thousands)</u>		
	<u>1994</u>	<u>1995</u>
Contract Engineering Support	0	301
Total	0	301
B. (U) <u>Budget Acquisition History and Planning Information (\$ in Thousands):</u>		
(U) Performing Organizations: N/A		
(U) Government Furnished Property: N/A		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY				PE NUMBER AND TITLE						PROJECT NO.			
#4 Demonstration & Validation				#0603851F ICBM Modernization Dem/Val						1022			
COST (\$ in Thousands)		FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost		
ICBM Reentry Vehicle Applications		0	2,200	5,673	10,549	15,723	19,704	20,994	21,785	LOE	LOE		
<p>A. (U) Mission Description and Budget Item Justification (\$ in Thousands)</p> <p>(U) ICBM Reentry Vehicle (RV) Applications efforts will respond to force structure guidance dictating a Minuteman III force of 500 missiles, arms control treaties/initiatives directing the Minuteman force be downloaded to a single RV configuration, the need to ensure Minuteman force contains the safest, most reliable RV, and Nuclear Posture Review guidance to sustain the RV industrial base. ICBM RV Applications efforts will address problems with operational reentry systems, meet real on-going needs, and ensure the availability of long-lead components/materials. This project will develop methods to better predict aging phenomenon, and identify life cycle cost reduction methods. Additionally, these efforts will maintain a minimum level of technical engineers and capability to respond to aging phenomenon and future requirements. RV work conducted under this program will leverage the Science & Technology community and coordinate with Navy RV efforts to eliminate duplication and realize synergistic cost savings.</p> <p>(U) <u>FY 1994</u> - Not applicable</p> <p>(U) <u>FY 1995</u></p> <ul style="list-style-type: none"> - (U) Identify and assess those critical attributes unique to ICBM requirements. (\$1,700) - (U) Conduct Safety Enhanced Reentry Vehicle (SERV) Phase 0 Study. (\$500) <p>(U) <u>FY 1996</u></p> <ul style="list-style-type: none"> - (U) Evaluate existing RV materials and identify potential material replacements. (\$1,886) - (U) Identify and evaluate options for improved aging prediction testing/measurement techniques. (\$1,287) - (U) Identify and evaluate options for improved sensors/instrumentation to better analyze operational RVs and materials. (\$900) - (U) Identify and evaluate options for improved fuze measurement tools. (\$800) - (U) Conduct Phase 0 work to develop SERV Milestone I documentation. (\$300) - (U) Identify and evaluate supportability for critical RV components. (\$300) - (U) Identify options to better measure/analyze accuracy contributors. (\$200) 													

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995																																										
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.																																											
#4 Demonstration & Validation	#0603851F ICBM Modernization Dem/Val	1022																																											
<p>(U) EY 199Z</p> <ul style="list-style-type: none"> (U) Continue to evaluate existing RV materials and potential material replacements; begin planning for ground and flight tests. (\$3,275) (U) Design, develop, and conduct prototype testing of selected aging prediction techniques and tools. (\$2,174) (U) Design, develop, and conduct prototype testing of selected fuze measurement tools. (\$2,100) (U) Design, develop, and conduct prototype testing of selected sensors/instruments. (\$1,700) (U) Identify potential replacement options for critical RV components. (\$800) (U) Conduct initial evaluation of improved accuracy measurement/techniques. (\$500) 																																													
<p>B. (U) <u>Program Change Summary (\$ in Thousands)</u></p> <table border="0"> <thead> <tr> <th></th> <th>1994</th> <th>1995</th> <th>1996</th> <th>1997</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Previous President's Budget*</td> <td>0</td> <td>10,939</td> <td>1,423</td> <td>703</td> <td>Cost</td> </tr> <tr> <td>Appropriated Value</td> <td></td> <td>2,500</td> <td></td> <td></td> <td>LOE</td> </tr> <tr> <td>Adjustments to Appropriated Value</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>SBIR</td> <td></td> <td>-300</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Adjustments to Budget Years Since FY95 PB</td> <td></td> <td></td> <td>4,250</td> <td>9,846</td> <td></td> </tr> <tr> <td>Current Budget Submit/President's Budget</td> <td>0</td> <td>2,200</td> <td>5,673</td> <td>10,549</td> <td>LOE</td> </tr> </tbody> </table>					1994	1995	1996	1997	Total	Previous President's Budget*	0	10,939	1,423	703	Cost	Appropriated Value		2,500			LOE	Adjustments to Appropriated Value						SBIR		-300				Adjustments to Budget Years Since FY95 PB			4,250	9,846		Current Budget Submit/President's Budget	0	2,200	5,673	10,549	LOE
	1994	1995	1996	1997	Total																																								
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Adjustments to Budget Years Since FY95 PB			4,250	9,846																																									
Current Budget Submit/President's Budget	0	2,200	5,673	10,549	LOE																																								
<p>Change Summary Explanation:</p> <p>(U) Funding: FY95 funding reduced during Congressional Budget cycle with direction to conduct Critical Attributes study. AF/CV and OSD approved and funded ICBM RV Applications Program in FY96-01.</p> <p>(U) Schedule: N/A ;</p> <p>(U) Technical: N/A</p>																																													
<p>*Program funding moved from PE 0603308F to PE 0603851F to comply with FY95 Appropriations language.</p>																																													
<p>C. (U) <u>Other Program Funding Summary (\$ in Thousands)</u> Not applicable</p>																																													
<p>Related RDT&E: PE 0604851F (ICBM Modernization EMD)</p>																																													

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE _____

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

#4 Demonstration & Validation

#0603851F ICBM Modernization Dem/Val

1022

D. (U) Schedule Profile

1994

1995

1996

1997

Conduct Critical Attributes Study

1 2 3 4

3

7

4

3

Conduct Phase 0 SERV Study
Develop SERV Milestone I Documentation

×

×

X

Evaluate Materials, Identify Replacements Begin Planning for Ground/Flight Tests

Aging Prediction Methodologies Identify Improved Prediction Techniques Design/Develop/Test Selected Techniques

\times
 \times
 \times

Sensor/Instrumentation Integration

sensor/instrumentation integration
Identify Options for Improved Sensors/Instrumentation
Design/Develop/Test Selected Sensors/Instruments

X

X

X

Accuracy Assessment Methodology

Accuracy Assessment Methodology

\times
 \times
 \times

Fuze Assessment

use Assessment
Identify Options for Improved Measurement Tools
Design/Develop/Test Selected Measurement Tools

X

X

X

X

Critical Components

- critical Components
- Identify Supportability
- Identify Potential Replacement Options

X

X

X

X

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#4 Demonstration & Validation	#0603851F ICBM Modernization Dem/Val	1022	
A. (U) <u>Project Cost Breakdown (\$ in Thousands)</u>			
	1994	1995	1996
Contract Engineering Support	0	2,200	5,673
Total	0	2,200	5,673
B. (U) <u>Budget Acquisition History and Planning Information (\$ in Thousands):</u>			
(U) Performing Organizations: N/A			
(U) Government Furnished Property: N/A			

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY				PE NUMBER AND TITLE						PROJECT NO.			
#4 Demonstration & Validation				#0603851F ICBM Modernization Dem/Val						1023			
COST (\$ in Thousands)		FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost		
Rocket System Launch Program		0	0	30	31	31	32	34	36	LOE	LOE		
A. (U) <u>Mission Description and Budget Item Justification (\$ in Thousands)</u>													
(U) This task supports studies/analysis for the adoption of the Multiservice Launch System (MSLS) or other alternative hardware for use on deactivated Peacekeeper missiles.													
(U) <u>FY 1994</u> - N/A													
(U) <u>FY 1995</u> - N/A													
(U) <u>FY 1996</u>													
- (U) Conduct studies/analysis for the adoption of Multiservice Launch System (MSLS) or MSLS-like guidance system for use on deactivated Peacekeeper missiles. (\$30)													
(U) <u>FY 1997</u>													
- (U) Continue studies/analysis for the adoption of Multiservice Launch System (MSLS) or MSLS-like guidance system for use on deactivated Peacekeeper missiles. (\$31)													

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

#4 Demonstration & Validation

#0603851F ICBM Modernization Dem/Valm 1023

B. (U) Program Change Summary (\$ in Thousands)

	1994	1995	1996	1997	Total Cost LOE
Previous President's Budget	0	0	30	31	
Appropriated Value	0	0			
Adjustments to Appropriated Value					
Adjustments to Budget Years Since FY95 PB					
Current Budget Submit/President's Budget	0	0	30	31	LOE

Change Summary Explanation:

(U) Funding: FY95 funded in PE 0603851F; FY94 funded in 0305119F

(U) Schedule: N/A

(U) Technical: N/A

C. (U) Other Program Funding Summary (\$ in Thousands) - N/A

Related RDT&E: PE 0605860F, Rocket System Launch Program (RSLP)
BA#6, Management Support

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995																																																			
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.																																																				
#4 Demonstration & Validation	#0603851F ICBM Modernization Dem/Val	1023																																																				
<p>D. <u>Schedule Profile</u></p> <p>Multiservice Launch System Applications Studies/Analysis</p> <table border="0"> <tr> <td></td> <td colspan="4">1994</td> <td colspan="4">1995</td> <td colspan="4">1996</td> <td colspan="4">1997</td> </tr> <tr> <td></td> <td>1</td><td>2</td><td>3</td><td>4</td> <td>1</td><td>2</td><td>3</td><td>4</td> <td>1</td><td>2</td><td>3</td><td>4</td> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> <tr> <td></td> <td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td> <td>X</td><td></td><td></td><td></td> <td></td><td>X</td><td></td><td></td> </tr> </table>					1994				1995				1996				1997					1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4										X					X		
	1994				1995				1996				1997																																									
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4																																						
									X					X																																								

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February 1995															
BUDGET ACTIVITY	PE NUMBER AND TITLE		PROJECT NO.															
#4 Demonstration & Validation	#0603851F ICBM Modernization Dem/Val		1023															
<p>A. (U) <u>Project Cost Breakdown (\$ in Thousands)</u></p> <table border="1"> <thead> <tr> <th></th> <th><u>1994</u></th> <th><u>1995</u></th> <th><u>1996</u></th> <th><u>1997</u></th> </tr> </thead> <tbody> <tr> <td>Studies/Analysis</td> <td align="center">0</td> <td align="center">0</td> <td align="center">30</td> <td align="center">31</td> </tr> <tr> <td>Total</td> <td align="center">0</td> <td align="center">0</td> <td align="center">30</td> <td align="center">31</td> </tr> </tbody> </table> <p>B. (U) <u>Budget Acquisition History and Planning Information (\$ in Thousands):</u></p> <p>(U) Performing Organizations: N/A</p> <p>(U) Government Furnished Property: N/A</p>					<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>	Studies/Analysis	0	0	30	31	Total	0	0	30	31
	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>														
Studies/Analysis	0	0	30	31														
Total	0	0	30	31														

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.			
#4 Demonstration & Validation		#0603851F ICBM Modernization Dem/Val								1024			
COST (\$ in Thousands)		FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost		
ICBM Command and Control Applications		0	301	200	200	200	200	200	200	LOE	LOE		
<p>A. (U) <u>Mission Description and Budget Item Justification (\$ in Thousands)</u></p> <p>(U) The deMIRVing of ICBMs and overall cutbacks in the number of nuclear weapons reduces the incentive to attack individual ICBM silos. Therefore, the incentive to attack Minuteman launch control centers will increase unless steps are taken to lessen an aggressor's confidence in being able to prevent missile launch by simultaneously destroying all launch control centers. This program funds efforts to identify existing technologies (Ground Launch Cruise Missile, Small ICBM, Airborne Launch Control Centers, etc.) to increase the uncertainty of destroying Minuteman launch control centers. The use of inter-squadron relay of launch commands, ground deplorable UHF repeaters for airborne launch control center commands, and alternative launch command nodes will be examined. The identification and use of existing military hardware, software, and system designs/documentation are principle concerns. Testing existing low-cost technology (fiber optic cable, telescoping antennas, etc.) under a generation scenario will be stressed. Methods to allow further disengagement and cost savings will be pursued.</p> <p>(U) <u>FY 1994</u> - Not applicable</p> <p>(U) <u>FY 1995</u></p> <p>- (U) Identify from previous ICBM Long Range Planning, System Program Office, and AFSPC studies candidate command and status methodologies. Refine analysis and downselect to a single study candidate. (\$301)</p> <p>(U) <u>FY 1996</u></p> <p>- (U) Identify technical and cost options for providing a Milstar EHF/SHF capability to Minuteman LCCs. (\$200)</p> <p>(U) <u>FY 1997</u></p> <p>- (U) Accomplish an in depth analysis for the remaining Enduring Command and Status Monitoring candidate. (\$200)</p>													

Exhibit R-3

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)						DATE	PROJECT NO.
BUDGET ACTIVITY	PE NUMBER AND TITLE						
#4 Demonstration & Validation	#0603851F ICBM Modernization Dem/Val					February 1995 1024	
B. (U) Program Change Summary (\$ in Thousands)							
Previous President's Budget	1994	1995	1996	1997	Total Cost LOE		
Appropriated Value	0	301	811	503			
Adjustments to Appropriated Value							
Adjustments to Budget Years Since FY95 PB		-611		-303			
Current Budget Submit/President's Budget	0	301	200	200	LOE		
Change Summary Explanation:							
(U) Funding: Funding in FY96 and beyond reduced for affordability issue.							
(U) Schedule: N/A							
(U) Technical: N/A							
C. (U) Other Program Funding Summary (\$ in Thousands)					To Total Cost		
	1994	1995	1996	1997	1998	1999	
Not applicable							
Related RDI&E: PE 0605851F							
D. (U) Schedule Profile							
	1994	1995	1996	1997	1998	1999	
	1	2	3	4	1	2	
Not applicable							

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February 1995															
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.																
#4 Demonstration & Validation	#0603851F ICBM Modernization Dem/Val	1024																
<p>A. (U) <u>Project Cost Breakdown (\$ in Thousands)</u></p> <table border="1"> <thead> <tr> <th></th> <th><u>1994</u></th> <th><u>1995</u></th> <th><u>1996</u></th> <th><u>1997</u></th> </tr> </thead> <tbody> <tr> <td>Contract Engineering Support</td> <td>0</td> <td>301</td> <td>200</td> <td>200</td> </tr> <tr> <td>Total</td> <td>0</td> <td>301</td> <td>200</td> <td>200</td> </tr> </tbody> </table>					<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>	Contract Engineering Support	0	301	200	200	Total	0	301	200	200
	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>														
Contract Engineering Support	0	301	200	200														
Total	0	301	200	200														
<p>B. (U) <u>Budget Acquisition History and Planning Information (\$ in Thousands):</u></p> <p>(U) Performing Organizations: N/A</p> <p>(U) Government Furnished Property: N/A</p>																		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#4 Demonstration and Validation		#0603851F ICBM Modernization Dem/Val								4209	
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Long Range Planning	*2,505	3,204	2,618	2,442	2,774	2,679	2,625	2,776	LOE	LOE	
<p>A. (U) Mission Description and Budget Item Justification (\$ in Thousands)</p> <p>The Long Range Planning (LRP) task analyzes the Minuteman III system to identify potential subsystem modifications required to meet user objectives relative to long term sustainment, technology insertion, employment, and force structure. The primary focus of the studies centers on system supportability, operability, reliability, and maintainability. Options/concepts generated by these studies are evaluated for feasibility, system impacts, and cost.</p> <p>(U) FY 1994</p> <ul style="list-style-type: none"> - (U) Demonstrated Computer Aided Flaw Detection and Evaluation (CAFDE) Phase I capability at the 9 million electron volt (MeV) computed tomography facility for Minuteman stage III. (\$130) - (U) Performed technology insertion studies such as Mk 21 on Minuteman III, Enduring Command and Status Monitoring, and updated the System Options Report. (\$1,490) - (U) Provided inputs in support of the Nuclear Posture Review. Produced an Integrated System Master Plan (ISMP) which identifies efforts to maintain ICBMs to 2020. (\$884) <p>(U) FY 1995</p> <ul style="list-style-type: none"> - (U) Performing technology insertion studies such as Minuteman III Gyrocompass Assembly (GCA) Technology Insertion Options, and Future ICBM Applications. (\$1,347) - (U) Performing CSD(M)/Remote Code Change study in response to Nuclear Posture Review (NPR) / Presidential Decision Directive (PDD) 30 requirements. (\$205) - (U) Performing life extension and feasibility studies such as Missile Guidance Performance Improvement Options, LF Electronics Life Extension, and Minuteman III Range Cost Reduction. (\$1,058) - (U) Support Long Range Planning tasks, develop the Systems Options Report (SOR), update the Logistics Program Management Plan (LPMP), and update the ICBM Master Plan (IMP). (\$595) <p>*FY94 and Prior Year funds appropriated in a different PE, 11213 Minuteman Squadrons.</p>											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#4 Demonstration and Validation	#0603851F ICBM Modernization Dem/Val	4209	
<p>(U) <u>FY 1996</u></p> <ul style="list-style-type: none"> - (U) Support Long Range Planning tasks, develop the SOR, and update the LPMP and IMP. (\$500) - (U) Plan to perform feasibility and life extension studies such as Weapon System Threat and Mission Assessment, and Post 2020 ICBM Force Structure Options. (\$1,597) - (U) Plan to perform technology insertion studies in support of changing ICBM environments such as Targeting Flexibility. (\$521) <p>(U) <u>FY 1997</u></p> <ul style="list-style-type: none"> - (U) Support Long Range Planning tasks, develop a SOR, and update the LPMP and IMP. (\$550) - (U) Plan to perform technology insertion studies in support of changing ICBM environments and life extension activities. (\$329) - (U) Plan to perform feasibility studies in direct support of Minuteman Life Extension to 2020. (\$1,563) 			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE		February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE		PROJECT NO.	
#4 Demonstration and Validation		#0603851F ICBM Modernization Dem/Val		4209	
B. (U) <u>Program Change Summary (\$ in Thousands)</u>					
Previous President's Budget	1994	1995	1996	1997	Total
Appropriated Value	2,504*	3,627	4,521	4,545	Cost
Adjustments to Appropriated Value	2,504*	3,627			LOE
Congressional Reductions		-223			
SBIR		-199			
Adjustments to Budget Years Since FY95 PB			-1,903	-2,103	
Current Budget Submit/President's Budget	2,504*	3,205	2,618	2,442	LOE
Change Summary Explanation:					
(U) Funding: Insignificant changes.					
(U) Schedule: N/A					
(U) Technical: N/A					
C. (U) <u>Other Program Funding Summary (\$ in Thousands)</u> Not applicable					
D. (U) <u>Schedule Profile</u>					
	1	2	3	4	1994
					1995
					1996
					1997
Contract Award	X*				
Program Reviews	X*	X*	X	X	X
Deliverable Reports					X
*FY94 funds appropriated in a different PE, 11213 Minuteman Squadrons.					

Exhibit R-2

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)			DATE	PROJECT NO.
BUDGET ACTIVITY	PE NUMBER AND TITLE			
#4 Demonstration and Validation	#0603851F ICBM Modernization Dem/Val		4209	
A. (U) <u>Project Cost Breakdown (\$ in Thousands)</u>				
	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>
Government Engineering Support	130	0	0	0
Contractor Engineering Support	1,490	2,610	2,241	2,357
Program Management Support	<u>884</u>	<u>595</u>	<u>377</u>	<u>387</u>
Total	2,504	3,205	2,618	2,744
(U) B. <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u>				
(U) Performing Organizations: N/A				
(U) Government Furnished Property: N/A				

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

4 - Demonstration And Validation

0603853F Evolved Expendable Launch Veh

0006

(EELV)

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
0006 Evolved Expendable Launch Vehicle*	10,000	29,046	39,226	57,035	0	0	0	0	0	135,307

* \$10M in FY 94 identified in PE 0603226E

(U) A. Mission Description and Budget Item Justification

The Evolved Expendable Launch Vehicle (EELV) program is a space launch vehicle development program. This program concept is based on the DoD's Bottom Up Review (BUR) and the Space Launch Modernization Plan by General Moorman. The purpose of this program is to replace the current fleet of expendable launch vehicles (Titan II, Delta, Atlas, and Titan IV) with a lower cost family of space launch vehicles. Program content includes the development of the design, demonstrations of key technologies, modifications to industrial capability and launch infrastructure, and demonstration flights of first article spacelift vehicles. The EELV family of vehicles must be capable of meeting the DoD's requirements for spacelift, as defined by the National Mission Model (medium and heavy lift). Funding between FY95-FY97 is budgeted in this Budget Activity Research Category because it supports risk reduction and validation of advanced technologies leading to lower cost expendable launch vehicles.

(U) FY 1994

- (U) FY95 Appropriation Law directed \$10 million of FY94 funds be made available for execution of EELV development in FY95.
- (U) Modify AF rocket engine test facilities at Phillips Laboratory (PL) and Arnold Engineering & Development Center (AEDC) (\$6,500 FY94 ARPA funding)
- (U) Mission Support (\$3,500 FY94 ARPA funding)

(U) FY 1995

- (U) Competitive award of four Risk Reduction (RR) module development contracts (\$20,000)
- (U) Compete modifications to AF rocket engine test facilities at PL and AEDC (\$7,300)
- (U) Mission Support (\$1,746)

(U) FY 1996

- (U) Complete four RR module contracts culminating in a "preliminary design review-like" event and downselect to two contractor concepts to continue into PRE EMD phase (\$35,000)
- (U) Mission Support (\$4,226)

(U) FY 1997

- (U) Award two PRE EMD phase contracts (\$51,000)
- (U) Mission Support (\$6,035)

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

4 - Demonstration And Validation

0603853F Evolved Expendable Launch Veh

PROJECT

0006

(EELV)

(U) Acquisition Strategy:

The EELV concept of a family of launch vehicles emphasizes commonality of hardware and infrastructure to enhance production and operations efficiencies. Cost improvements will be achieved through reduction of supporting infrastructure (launch pads, manufacturing facilities, workforce) and optimization of production and launch operations, processes, and rates. Development contracts will be awarded on the basis of full and open competition. Production contracts will be sole source to a single spacelift provider. The EELV acquisition strategy is outlined in the DoD's Report to Congress.

(U) B. Program Change Summary (\$ in Thousands)

(U) Previous President's Budget	FY 1994	FY 1995	FY 1996	FY 1997
(U) Appropriated Value	0	0	0	0
(U) Adjustments to Appropriated Value		30,000		
a. Cong Gen Reductions		-328		
b. SBIR		-626		
c. Cong Directed Addition	+10,000			
d. Below Threshold Reprogramming				
(U) Adjustments to Budget Years Since FY95 PB	+10,000		+39,226	+57,035
(U) Current Budget Submit/President's Budget	+10,000	29,046	39,226	57,035

(U) Change Summary Explanation:

Funding: EELV is a new program. Funding for FY94 and FY95 was initiated by Congress and funding in FY96 and subsequent year funding was requested in the FY96/FY97 Budget Request.

Schedule: New Program.

Technical: Not Applicable.

(U) C. Other Program Funding Summary (\$ in Thousands)

	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	To Compl	Total Cost
(U) Atlas Reliability Enhancement Program (AREP) from non-AF budget			76,000	15,000			7,000			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

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PROJECT

4 - Demonstration And Validation

0603853F Evolved Expendable Launch Veh

0006

(EELV)

	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	To Compl	Total Cost
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Related RDT&E:

- (U) EELV EMD (PE 64853F).
- (U) Medium Launch Vehicles (PE 35119F).
- (U) Titan Space Launch Vehicles (PE 35144F).

(U) D. Schedule ProfileRisk Reduction Module

- (U) Acquisition Strategy Panel (ASP)
- (U) Defense Acquisition Exec. Review
- (U) Contract Awards
- (U) "PDR-like" Event/Downselect

EMD Part 1 Module

- (U) Defense Acquisition Exec. Review
- (U) "CDR-like" Event/Downselect

EMD Part 2 Module

- (U) PP/M planned for late-first qtr/early-second qtr FY98 start

1	FY 1994 2	3	4	1	FY 1995 2	3	4	1	FY 1996 2	3	4	1	FY 1997 2	3	4	1	FY 1998 2	3	4	1	FY 1999 2	3	4	1	FY 2000 2	3	4	1	FY 2001 2	3	4	1	FY 2002 2	3	4	1	FY 2003 2	3	4	1	FY 2004 2	3	4	1	FY 2005 2	3	4	1	FY 2006 2	3	4	1	FY 2007 2	3	4	1	FY 2008 2	3	4	1	FY 2009 2	3	4	1	FY 2010 2	3	4	1	FY 2011 2	3	4	1	FY 2012 2	3	4	1	FY 2013 2	3	4	1	FY 2014 2	3	4	1	FY 2015 2	3	4	1	FY 2016 2	3	4	1	FY 2017 2	3	4	1	FY 2018 2	3	4	1	FY 2019 2	3	4	1	FY 2020 2	3	4	1	FY 2021 2	3	4	1	FY 2022 2	3	4	1	FY 2023 2	3	4	1	FY 2024 2	3	4	1	FY 2025 2	3	4	1	FY 2026 2	3	4	1	FY 2027 2	3	4	1	FY 2028 2	3	4	1	FY 2029 2	3	4	1	FY 2030 2	3	4	1	FY 2031 2	3	4	1	FY 2032 2	3	4	1	FY 2033 2	3	4	1	FY 2034 2	3	4	1	FY 2035 2	3	4	1	FY 2036 2	3	4	1	FY 2037 2	3	4	1	FY 2038 2	3	4	1	FY 2039 2	3	4	1	FY 2040 2	3	4	1	FY 2041 2	3	4	1	FY 2042 2	3	4	1	FY 2043 2	3	4	1	FY 2044 2	3	4	1	FY 2045 2	3	4	1	FY 2046 2	3	4	1	FY 2047 2	3	4	1	FY 2048 2	3	4	1	FY 2049 2	3	4	1	FY 2050 2	3	4	1	FY 2051 2	3	4	1	FY 2052 2	3	4	1	FY 2053 2	3	4	1	FY 2054 2	3	4	1	FY 2055 2	3	4	1	FY 2056 2	3	4	1	FY 2057 2	3	4	1	FY 2058 2	3	4	1	FY 2059 2	3	4	1	FY 2060 2	3	4	1	FY 2061 2	3	4	1	FY 2062 2	3	4	1	FY 2063 2	3	4	1	FY 2064 2	3	4	1	FY 2065 2	3	4	1	FY 2066 2	3	4	1	FY 2067 2	3	4	1	FY 2068 2	3	4	1	FY 2069 2	3	4	1	FY 2070 2	3	4	1	FY 2071 2	3	4	1	FY 2072 2	3	4	1	FY 2073 2	3	4	1	FY 2074 2	3	4	1	FY 2075 2	3	4	1	FY 2076 2	3	4	1	FY 2077 2	3	4	1	FY 2078 2	3	4	1	FY 2079 2	3	4	1	FY 2080 2	3	4	1	FY 2081 2	3	4	1	FY 2082 2	3	4	1	FY 2083 2	3	4	1	FY 2084 2	3	4	1	FY 2085 2	3	4	1	FY 2086 2	3	4	1	FY 2087 2	3	4	1	FY 2088 2	3	4	1	FY 2089 2	3	4	1	FY 2090 2	3	4	1	FY 2091 2	3	4	1	FY 2092 2	3	4	1	FY 2093 2	3	4	1	FY 2094 2	3	4	1	FY 2095 2	3	4	1	FY 2096 2	3	4	1	FY 2097 2	3	4	1	FY 2098 2	3	4	1	FY 2099 2	3	4	1	FY 2100 2	3	4	1	FY 2101 2	3	4	1	FY 2102 2	3	4	1	FY 2103 2	3	4	1	FY 2104 2	3	4	1	FY 2105 2	3	4	1	FY 2106 2	3	4	1	FY 2107 2	3	4	1	FY 2108 2	3	4	1	FY 2109 2	3	4	1	FY 2110 2	3	4	1	FY 2111 2	3	4	1	FY 2112 2	3	4	1	FY 2113 2	3	4	1	FY 2114 2	3	4	1	FY 2115 2	3	4	1	FY 2116 2	3	4	1	FY 2117 2	3	4	1	FY 2118 2	3	4	1	FY 2119 2	3	4	1	FY 2120 2	3	4	1	FY 2121 2	3	4	1	FY 2122 2	3	4	1	FY 2123 2	3	4	1	FY 2124 2	3	4	1	FY 2125 2	3	4	1	FY 2126 2	3	4	1	FY 2127 2	3	4	1	FY 2128 2	3	4	1	FY 2129 2	3	4	1	FY 2130 2	3	4	1	FY 2131 2	3	4	1	FY 2132 2	3	4	1	FY 2133 2	3	4	1	FY 2134 2	3	4	1	FY 2135 2	3	4	1	FY 2136 2	3	4	1	FY 2137 2	3	4	1	FY 2138 2	3	4	1	FY 2139 2	3	4	1	FY 2140 2	3	4	1	FY 2141 2	3	4	1	FY 2142 2	3	4	1	FY 2143 2	3	4	1	FY 2144 2	3	4	1	FY 2145 2	3	4	1	FY 2146 2	3	4	1	FY 2147 2	3	4	1	FY 2148 2	3	4	1	FY 2149 2	3	4	1	FY 2150 2	3	4	1	FY 2151 2	3	4	1	FY 2152 2	3	4	1	FY 2153 2	3	4	1	FY 2154 2	3	4	1	FY 2155 2	3	4	1	FY 2156 2	3	4	1	FY 2157 2	3	4	1	FY 2158 2	3	4	1	FY 2159 2	3	4	1	FY 2160 2	3	4	1	FY 2161 2	3	4	1	FY 2162 2	3	4	1	FY 2163 2	3	4	1	FY 2164 2	3	4	1	FY 2165 2	3	4	1	FY 2166 2	3	4	1	FY 2167 2	3	4	1	FY 2168 2	3	4	1	FY 2169 2	3	4	1	FY 2170 2	3	4	1	FY 2171 2	3	4	1	FY 2172 2	3	4	1	FY 2173 2	3	4	1	FY 2174 2	3	4	1	FY 2175 2	3	4	1	FY 2176 2	3	4	1	FY 2177 2	3	4	1	FY 2178 2	3	4	1	FY 2179 2	3	4	1	FY 2180 2	3	4	1	FY 2181 2	3	4	1	FY 2182 2	3	4	1	FY 2183 2	3	4	1	FY 2184 2	3	4	1	FY 2185 2	3	4	1	FY 2186 2	3	4	1	FY 2187 2	3	4	1	FY 2188 2	3	4	1	FY 2189 2	3	4	1	FY 2190 2	3	4	1	FY 2191 2	3	4	1	FY 2192 2	3	4	1	FY 2193 2	3	4	1	FY 2194 2	3	4	1	FY 2195 2	3	4	1	FY 2196 2	3	4	1	FY 2197 2	3	4	1	FY 2198 2	3	4	1	FY 2199 2	3	4	1	FY 2200 2	3	4	1	FY 2201 2	3	4	1	FY 2202 2	3	4	1	FY 2203 2	3	4	1	FY 2204 2	3	4	1	FY 2205 2	3	4	1	FY 2206 2	3	4	1	FY 2207 2	3	4	1	FY 2208 2	3	4	1	FY 2209 2	3	4	1	FY 2210 2	3	4	1	FY 2211 2	3	4	1	FY 2212 2	3	4	1	FY 2213 2	3	4	1	FY 2214 2	3	4	1	FY 2215 2	3	4	1	FY 2216 2	3	4	1	FY 2217 2	3	4	1	FY 2218 2	3	4	1	FY 2219 2	3	4	1	FY 2220 2	3	4	1	FY 2221 2	3	4	1	FY 2222 2	3	4	1	FY 2223 2	3	4	1	FY 2224 2	3	4	1	FY 2225 2	3	4	1	FY 2226 2	3	4	1	FY 2227 2	3	4	1	FY 2228 2	3	4	1	FY 2229 2	3	4	1	FY 2230 2	3	4	1	FY 2231 2	3	4	1	FY 2232 2	3	4	1	FY 2233 2	3	4	1	FY 2234 2	3	4	1	FY 2235 2	3	4	1	FY 2236 2	3	4	1	FY 2237 2	3	4	1	FY 2238 2	3	4	1	FY 2239 2	3	4	1	FY 2240 2	3	4	1	FY 2241 2	3	4	1	FY 2242 2	3	4	1	FY 2243 2	3	4	1	FY 2244 2	3	4	1	FY 2245 2	3	4	1	FY 2246 2	3	4	1	FY 2247 2	3	4	1	FY 2248 2	3	4	1	FY 2249 2	3	4	1	FY 2250 2	3	4	1	FY 2251 2	3	4	1	FY 2252 2	3	4	1	FY 2253 2	3	4	1	FY 2254 2	3	4	1	FY 2255 2	3	4	1	FY 2256 2	3	4	1	FY 2257 2	3	4	1	FY 2258 2	3	4	1	FY 2259 2	3	4	1	FY 2260 2	3	4	1	FY 2261 2	3	4	1	FY 2262 2	3	4	1	FY 2263 2	3	4	1	FY 2264 2	3	4	1	FY 2265 2	3	4	1	FY 2266 2	3	4	1	FY 2267 2	3	4	1	FY 2268 2	3	4	1	FY 2269 2	3	4	1	FY 2270 2	3	4	1	FY 2271 2	3	4	1	FY 2272 2	3	4	1	FY 2273 2	3	4	1	FY 2274 2	3	4	1	FY 2275 2	3	4	1	FY 2276 2	3	4	1	FY 2277 2	3	4	1	FY 2278 2	3	4	1	FY 2279 2	3	4	1	FY 2280 2	3	4	1	FY 2281 2	3	4	1	FY 2282 2	3	4	1	FY 2283 2	3	4	1	FY 2284 2	3	4	1	FY 2285 2	3	4	1	FY 2286 2	3	4	1	FY 2287 2	3	4	1	FY 2288 2	3	4	1	FY 2289 2	3	4	1	FY 2290 2	3	4	1	FY 2291 2	3	4	1	FY 2292 2	3	4	1	FY 2293 2	3	4	1	FY 2294 2	3	4	1	FY 2295 2	3	4	1	FY 2296 2	3	4	1	FY 2297 2	3	4	1	FY 2298 2	3	4	1	FY 2299 2	3	4	1	FY 2300 2	3	4	1	FY 2301 2	3	4	1	FY 2302 2	3	4	1	FY 2303 2	3	4	1	FY 2304 2	3	4	1	FY 2305
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UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February, 1995																									
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT																										
4 - Demonstration And Validation	0603853F Evolved Expendable Launch Veh (EELV)	0006																										
<p>(U) A. <u>Project Cost Breakdown (\$ in Thousands)</u></p> <table border="1"> <thead> <tr> <th></th> <th>FY 1994*</th> <th>FY 1995</th> <th>FY 1996</th> <th>FY 1997</th> </tr> </thead> <tbody> <tr> <td>(U) Primary Hardware Development</td> <td>0</td> <td>20,000</td> <td>35,000</td> <td>51,000</td> </tr> <tr> <td>(U) Rocket Engine Test Stand Modifications</td> <td>6,500</td> <td>7,300</td> <td>0</td> <td>0</td> </tr> <tr> <td>(U) Mission Support</td> <td>3,500</td> <td>1,746</td> <td>4,226</td> <td>6,035</td> </tr> <tr> <td>(U) Total</td> <td>10,000</td> <td>29,046</td> <td>39,226</td> <td>57,035</td> </tr> </tbody> </table> <p>* NOTE: Project costs indicated in FY94 will be incurred in FY95 and funded from ARPAs FY94 Appropriation</p> <p>(U) B. <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u> Not Applicable.</p>					FY 1994*	FY 1995	FY 1996	FY 1997	(U) Primary Hardware Development	0	20,000	35,000	51,000	(U) Rocket Engine Test Stand Modifications	6,500	7,300	0	0	(U) Mission Support	3,500	1,746	4,226	6,035	(U) Total	10,000	29,046	39,226	57,035
	FY 1994*	FY 1995	FY 1996	FY 1997																								
(U) Primary Hardware Development	0	20,000	35,000	51,000																								
(U) Rocket Engine Test Stand Modifications	6,500	7,300	0	0																								
(U) Mission Support	3,500	1,746	4,226	6,035																								
(U) Total	10,000	29,046	39,226	57,035																								

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Exhibit R-3

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY			PE NUMBER AND TITLE										
#5 - Engineering & Manufacturing Development			#0604201F - Aircraft Avionics Equipment Development										
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost			
Total Program Element (PE) Cost	6,224	4,680	16,892	23,529	17,985	9,875	4,928	3,268	Continuing	TBD			
Proj 225Z - Standard Avionics/Joint Service Review Committee (JSRC) Initiatives	2,092	1,129	1,231	1,061	1,303	1,332	1,454	1,579	Continuing	TBD			
Proj 2258 - Inertial Navigation Systems (INS)	453	533	533	480	0	0	0	0	0	28,753			
Proj 3264 - Standard Flight Data Recorder (SFDR)	823	704	0	0	0	0	0	0	0	38,599			
Proj 401Z - Compass/Attitude & Heading Reference System (C/AHRS)	2,856	2,314	3,686	2,985	465	186	192	197	Continuing	TBD			
Proj 2050 - Joint Helmet-Mounted Cueing System (JHMCS)	0	0	11,442	19,003	16,217	8,357	3,282	1,492	Continuing	TBD			
A. (U) Mission Description and Budget Item Justification													
This program element explores and develops standard avionics architecture and equipment which will reduce acquisition and support costs, increase weapon system performance and availability, and foster weapons system interoperability of standard interfaces and components. This program element is devoted to the Engineering and Manufacturing Development (EMD) of standard avionics architecture and equipment. The scope is both domestic and international. Reliability and Maintainability (R&M) play a major role in the identification of specific development efforts within this element as evidenced by the evolution of the Standard Inertial Navigation Unit, the Standard Flight Data Recorder and the Compass/Attitude & Heading Reference System. Joint avionics development efforts are pursued through participation in and support of the Joint Service Review Committee (JSRC). Current initiatives include the Embedded Global Positioning System/Inertial Navigation System, and the Joint Helmet-Mounted Cueing System. Acquisition strategy is incorporated at the project level.													

Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)					DATE		February 1995	
BUDGET ACTIVITY			PE NUMBER AND TITLE					
#5 - Engineering & Manufacturing Development			#0604201F - Aircraft Avionics Equipment Development					
B. (U) <u>Program Change Summary (\$ in Thousands)</u>								
			<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>Total</u>	
Previous President's Budget			6,570	4,824	6,237	5,298	Cost	
Appropriated Value			6,570	4,824			TBD	
Adjustments to Appropriated Value								
a. General Undistributed reductions				-53				
b. Below threshold Reprogramming			-255	0				
c. Small Business Innovative Research (SBIR)			-91	-91				
Adjustments to Budget Years since FY95 PB					10,655	18,231		
Current Budget Submit/President's Budget			6,224	4,680	16,892	23,529	TBD	
Change Summary Explanation:								
Funding: Below Threshold Reprogramming reduction was part of FY94 Omnibus reprogramming bill. FY95 reduced for FFRDC, Non-FFRDC, University Research, and Travel. FY96 and FY97 increased for the addition of Joint Helmet Mounted Cueing System.								
Schedule: No Changes								
Technical: No Changes,								
C. (U) <u>Other Program Funding Summary (\$ in Thousands)</u> Not Applicable								
D. (U) <u>Schedule Profile:</u> See individual projects								

Exhibit R-2

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY				PE NUMBER AND TITLE						PROJECT NO.			
#5 - Engineering and Manufacturing Development				#0604201F - Aircraft Avionics Equipment Development - 2257									
COST (\$ in Thousands)				FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Proj 2257 - Standard Avionics/Joint Service Review Committee (JSRC) Initiatives				2,092	1,129	1,231	1,061	1,303	1,332	1,454	1,579	Continuing	TBD
A. (U) Mission Description and Budget Item Justification													
This project identifies/develops candidate architecture standards and systems in the Air Force and through the JSRC. Maintains/updates the common Avionics database to promote aircraft interoperability. Supports international avionics initiatives and standardization activities. Develops an opportunity matrix for tactical and airlift programs to identify opportunities to leverage investments. JSRC is a phase 0 concept studies project that explores candidate avionics systems and designs for potential developmental efforts and aircraft interoperability initiatives.													
(U) <u>FY 1994 Program</u>													
- (U) Continued front-end work to identify avionics standardization opportunities through Air Force and JSRC. (\$213)													
- (U) Continued Modular Avionics System Architecture (MASA) demonstration/validation and conducted a Multi-Command Common Radar (MCCR) development (conduct formal System Requirement Review (SRR) on T-38 MASA avionics upgrade). (\$983)													
- (U) Updated Avionics database and developed opportunity matrix. (\$416)													
- (U) Program Management Support. (\$480)													
(U) <u>FY 1995 Program</u>													
- (U) Continue T-38 upgrade. (\$133)													
- (U) MARK XV (Next generation Identification Friend or Foe (IFF)) close-out support. (\$88)													
- (U) Continue Avionics Roadmap. (\$300)													
- (U) Continue MASA Electronic Cockpit. (\$50)													
- (U) Product Group Manager Support. (\$170)													
- (U) Program Management Support. (\$388)													

Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#5 - Engineering and Manufacturing Development	#0604201F - Aircraft Avionics Equipment Development	2257	
<p>A. (U) <u>Mission Description and Budget Item Justification (Cont.)</u></p> <p>(U) <u>FY 1996 Planned Program</u></p> <ul style="list-style-type: none"> - (U) Continue tri-service standardization opportunities via the Joint Service Review Committee (JSRC) processes. (\$343) - (U) Product Group Manager Support. (\$170) - (U) Continue Modular Avionics System Architecture (MASA) avionics upgrade. (NSP) - (U) Continue Avionics Planning Baseline. (\$300) - (U) Program Management Support. (\$418) <p>(U) <u>FY 1997 Planned Program</u></p> <ul style="list-style-type: none"> - (U) Continue tri-service standardization opportunities via the JSRC processes. (\$173) - (U) Product Group Manager Support. (\$170) - (U) Continue Avionics Planning Baseline. (\$300) - (U) Program Management Support. (\$418) 			

Exhibit R-2

UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#5 - Engineering and Manufacturing Development		#0604201F - Aircraft Avionics Equipment Development - 2257									
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Proj 2257 - Standard Avionics/Joint Service Review Committee (JSRC) Initiatives	2,092	1,129	1,231	1,061	1,303	1,332	1,454	1,579	Continuing	TBD	
B. (U) Program Change Summary (\$ in Thousands)											
Previous President's Budget		1994		1995		1996		1997		Total Cost	
Appropriated Value		2,485		2,510		2,533		2,511		TBD	
Adjustments to Appropriated Value		2,485		2,510		2,533		2,511		TBD	
a. General Congressional Reduction				-53							
b. Below Threshold Reprogramming		-302		-1,237							
c. Small business Innovative Research (SBIR)		-91		-91							
Adjustments to Budget Years since FY95 PB						-1,302		-1,450			
Current Budget Submit/President's Budget		2,092		1,129		1,231		1,061		TBD	
Change Summary Explanation:											
Funding: Below Threshold Reprogramming within PE 64201F in FY94 and FY95 to cover program priority requirements. Reductions in FY95 for FFRDC, Non - FFRDC, University Research, and Travel. FY96 and FY97 RDT&E funds decreased due to reduction in JSRC and Standard Avionics initiatives. FY96 and FY97 also reduced due to realignment of funds within PE 64201F to cover a higher priority requirement in the Inertial Navigation Systems Project (Proj 2258).											
Schedule: No Changes											
Technical: No Changes											

Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995											
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.												
#5 - Engineering and Manufacturing Development	#0604201F - Aircraft Avionics Equipment Development	2257												
C. (U) <u>Other Program Funding Summary (\$ in Thousands)</u> Not Applicable														
D. (U) <u>Schedule Profile</u>														
Publish Avionics Planning Baseline	<table border="0"> <tr> <td>1994</td> <td>1995</td> <td>1996</td> <td>1997</td> </tr> <tr> <td>1 2 3 4</td> <td>1 2 3 4</td> <td>1 2 3 4</td> <td>1 2 3 4</td> </tr> <tr> <td>* X</td> <td>X</td> <td>X</td> <td>X</td> </tr> </table>	1994	1995	1996	1997	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	* X	X	X	X	
1994	1995	1996	1997											
1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4											
* X	X	X	X											
* - Completed Effort X - Start of Effort														

Exhibit R-2

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)			DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE		PROJECT NO.
#5 - Engineering and Manufacturing Development		#0604201F - Aircraft Avionics Equipment Development		2257
A. (U) <u>Project Cost Breakdown (\$ in Thousands)</u>				
- Avionics Database	1994 416	1995 300	1996 300	1997 300
- Modular Avionics System Architecture (MASA)	983	183	0	0
- Joint Service Review Committee (JSRC)	213	88	343	173
- Program Management Support	480	388	418	418
- Product Group Mgt Spt	0	170	170	170
Total	2,092	1,129	1,231	1,061
B. (U) <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u> Not Applicable				

Exhibit R-3

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#5 - Engineering and Manufacturing Development		#0604201F - Aircraft Avionics Equipment Development - 2258									
COST (\$ in Thousands)		FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
2258 - Inertial Navigation Systems (INS)		453	533	533	480	0	0	0	0	0	28,753
<p>A. (U) <u>Mission Description and Budget Item Justification</u></p> <p>Develop DoD standard Embedded Global Positioning System (GPS)/ Inertial Navigation System (INS) (EGI) Precise Positioning System (PPS), (0.8 nm/h free inertial) Navigation System for Army's OH-58 Kiowa Warrior, Special Operations, Apache AH-64A+ and AH-64 C/D Apache Longbow helicopters, Navy's AH-1W Super Cobra helicopter, F-18 aircraft, EA-6B aircraft, and Air Force F-15 Eagle. Directly tied to the Congressionally mandated Minimum Avionics Requirement (MAR) capability for DoD aircraft and the Joint Chiefs of Staff (JCS) Radio Navigation Master Plan. Develop enhanced accuracy (0.3 nm/hr) Inertial Navigation Unit (INU) for the F-117A aircraft. Continue development of INU depot Support Equipment (SE) for the Standard Ring Laser Gyro (RLG) program. Embedded GPS/INS efforts resulted from a Tri-service acquisition plan. Program currently is in phase III (production). Contracts were awarded on a full and open basis to Honeywell and Litton Industries.</p> <p>(U) <u>FY 1994 Program</u> (Funded with aircraft Program Element funds)</p> <ul style="list-style-type: none"> - (U) Completed system development activities; transfer residual tasks to depot. (Not Separately Priced, NSP) - (U) Completed Embedded GPS/INU technology risk reduction test program. (NSP) - (U) Awarded Embedded GPS/INU contract for initial tri-service programs. (NSP) - (U) Delivered initial integration units to tri-service platforms. (NSP) - (U) Began Qualification, Testing, and Evaluation (QT&E) program. (NSP) - (U) Completed Enhanced Accuracy INU (Revision C) testing program for F-117A. (NSP) - (U) Began Enhanced Accuracy INU (Revision C) integration. (NSP) - (U) Program Management Support. (\$453) <p>(U) <u>FY 1995 Program</u> (Funded with aircraft Program Element funds.)</p> <ul style="list-style-type: none"> - (U) Complete QT&E program. (NSP) - (U) Complete Enhanced Accuracy INU testing and integration for F-117A. (NSP) - (U) Program Management Support. (\$533) 											

Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY			PE NUMBER AND TITLE							PROJECT NO.			
#5 - Engineering and Manufacturing Development			#0604201F - Aircraft Avionics Equipment Development - 2258										
COST (\$ in Thousands)			FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
2258 - Inertial Navigation Systems (INS)			453	533	533	480	0	0	0	0	0	28,753	
A. (U) Mission Description and Budget Item Justification (Cont.)													
(U) FY 1996 Planned Program													
- (U) Continue Embedded Global Positioning Satellite (GPS) Inertial Navigation System (INS) (EGI) integration. (NSP)													
- (U) Program Management Support. (\$533)													
(U) FY 1997 Planned Program													
- (U) Conduct follow-on EGI procurement source selection. (NSP)													
- (U) Program Management Support. (\$480)													
B. (U) Program Change Summary (\$ in Thousands)													
Previous President's Budget													
Appropriated Value													
Adjustments to Appropriated Value													
Below Threshold Reprogramming													
Adjustments to Budget Years since FY95 PB													
Current Budget Submit/President's Budget													
Change Summary Explanation:													
Funding: FY94 and FY95 Below Threshold Reprogramming and FY96 - FY97 increases to meet Congressionally mandated Minimum Avionics Requirement (MAR) capability for DoD aircraft by the year 2000.													
Schedule: FY95/97 tasks added to comply with Congressionally mandated Minimum Avionics Requirement (MAR) capability for DoD aircraft by year 2000. Technical: No Changes													

Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995																																																																																																										
BUDGET ACTIVITY				PE NUMBER AND TITLE						PROJECT NO.																																																																																																												
#5 - Engineering and Manufacturing Development				#0604201F - Aircraft Avionics Equipment Development - 2258																																																																																																																		
COST (\$ in Thousands)		FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost																																																																																																											
2258 - Inertial Navigation Systems (INS)		453	533	533	480	0	0	0	0	0	28,753																																																																																																											
<p>C. (U) <u>Other Program Funding Summary (\$ in Thousands)</u> Not Applicable</p> <p>D. (U) <u>Schedule Profile</u></p> <table border="0"> <tr> <td></td> <td></td> <td align="center" colspan="3">1994</td> <td></td> <td align="center" colspan="3">1995</td> <td></td> <td align="center" colspan="3">1996</td> <td></td> <td align="center" colspan="3">1997</td> </tr> <tr> <td></td> <td></td> <td align="center">1</td> <td align="center">2</td> <td align="center">3</td> <td align="center">4</td> <td align="center">1</td> <td align="center">2</td> <td align="center">3</td> <td align="center">4</td> <td align="center">1</td> <td align="center">2</td> <td align="center">3</td> <td align="center">4</td> <td align="center">1</td> <td align="center">2</td> <td align="center">3</td> <td align="center">4</td> </tr> <tr> <td>- Complete Risk Reduction test program</td> <td></td> <td></td> <td></td> <td align="center">*</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>- Awarded Tri-service Global Positioning System/ Inertial Navigation Unit (GPS/INU) Contract</td> <td align="center">*</td> <td></td> <td></td> <td></td> <td></td> <td align="center">X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>- Complete F-117 Testing</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>- Complete Qualification, Testing, and Evaluation (QT&E)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td align="center">X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>														1994				1995				1996				1997					1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	- Complete Risk Reduction test program				*														- Awarded Tri-service Global Positioning System/ Inertial Navigation Unit (GPS/INU) Contract	*					X												- Complete F-117 Testing																		- Complete Qualification, Testing, and Evaluation (QT&E)										X							
		1994				1995				1996				1997																																																																																																								
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4																																																																																																					
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<p>* - Completed Effort</p> <p>X - Planned Effort</p>																																																																																																																						

Exhibit R-2

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#5 - Engineering and Manufacturing Development		#0604201F - Aircraft Avionics Equipment Development - 2258	
A. (U) <u>Project Cost Breakdown (\$ in Thousands)</u>			
		<u>1994</u>	<u>1995</u>
			<u>1996</u>
			<u>1997</u>
Program Management Support		<u>453</u>	<u>533</u>
Total		<u>453</u>	<u>533</u>
B. (U) <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u> Not Applicable			

Exhibit R-3

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.			
#5 - Engineering and Manufacturing Development		#0604201F - Aircraft Avionics Equipment Development - 3264											
COST (\$ in Thousands)		FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost		
3264 - Standard Flight Data Recorder (SFDR)		823	704	0	0	0	0	0	0	0	0	38,599	
<p>A. (U) <u>Mission Description and Budget Item Justification</u></p> <p>A Joint Service Review Committee-sponsored initiative to develop a standard crash survivable flight data recorder for various Air Force aircraft. SFDR contract was awarded in Jul 88 to Smith Industries, Firm Fixed Price (FFP). Program is currently in Phase II, (Engineering, Manufacturing, and Development).</p> <p>(U) <u>FY 1994 Program</u></p> <ul style="list-style-type: none"> - (U) Completed development for Helo (MH-53) application. (\$563K) - (U) Program Mission Support. (\$260K) <p>(U) <u>FY 1995 Planned Program</u></p> <ul style="list-style-type: none"> - (U) Complete Test Program Software Development. (\$604K) - (U) Mission Support. (\$100K) <p>(U) <u>FY 1996</u> - Not Applicable</p> <p>(U) <u>FY 1997</u> - Not Applicable ;</p>													

Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.			
#5 - Engineering and Manufacturing Development		#0604201F - Aircraft Avionics Equipment Development - 3264											
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost			
3264 - Standard Flight Data Recorder (SFDR)	823	704	0	0	0	0	0	0	0	38,599			
B. (U) Program Change Summary (\$ in Thousands)													
Previous President's Budget	1994		1995		1996		1997		Total Cost				
Appropriated Value	856		0		0		0		37,928				
Adjustments to Appropriated Value	856												
a. Below Threshold Reprogramming	-33		704		0		0		38,599				
Current Budget Submit/President's Budget	823		704		0		0		38,599				
Change Summary Explanation:													
Funding: FY94 Below Threshold Reprogramming within PE 64201F in FY95 to complete Test Program Software (TPS)													
Development.													
Schedule: No Changes													
Technical: No Changes													
C. (U) Other Program Funding Summary (\$ in Thousands) Not Applicable													
D. (U) Schedule Profile													
		1994		1995		1996		1997					
		1	2	3	4	1	2	3	4	1	2	3	4
Integrated Process													
Team (IPT) Leadership Transfer *													
Data Processing Unit Production Deliveries X													
TPS Development X													
MH-53 SFDR Functional Configuration													
Audit/ Physical Configuration Audit (FCA/PCA) X													
* - Completed Effort													
X - Planned Effort													

Exhibit R-2

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	PROJECT NO.
BUDGET ACTIVITY	PE NUMBER AND TITLE		
#5 - Engineering and Manufacturing Development	#064201F - Aircraft Avionics Equipment Development - 3264		
A. <u>Project Cost Breakdown (\$ in Thousands)</u>			
		<u>1994</u>	<u>1995</u>
Air Force Helicopter Development		563	0
Contractor Residual Tasks		110	0
Mission Support		150	100
Test Program Sets		<u>0</u>	<u>604</u>
Total		823	<u>704</u>
			<u>1996</u>
			0
			0
			0
			<u>0</u>
			0
			<u>1997</u>
			0
			0
			0
			<u>0</u>
			0

Exhibit R-3

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#5 - Engineering and Manufacturing Development		#0604201F - Aircraft Avionics Equipment Development - 4017									
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
4017 - Compass/Attitude & Heading Reference System (C/AHRS)	2,856	2,314	3,686	2,985	465	186	192	197	Continuing	TBD	
<p>A. (U) <u>Mission Description and Budget Item Justification</u></p> <p>Joint Service Review Committee-supported program. Develops functional replacement systems for several existing compass systems and C/AHRS for use in various Air Force and Navy aircraft. Tri-service Memorandum Of Agreement (MOA) includes the Army as a potential user. C/AHRS is currently in phase II (Engineering, Manufacturing and Development). Contract awarded to Smith Industries, Cost Plus Firm Fixed Fee (CPFF).</p> <p>(U) <u>FY 1994 Program</u></p> <ul style="list-style-type: none"> - (U) Continued design/development of units for qualification/durability and flight testing. (\$2,250) - (U) Began fabrication of units for flight/qualification/durability testing. (\$232) - (U) Program Management Support. (\$374) <p>(U) <u>FY 1995 Planned Program</u></p> <ul style="list-style-type: none"> - (U) Continue system development. (\$805) - (U) Complete fabrication of units for flight/qualification/durability testing. (\$1,000) - (U) Begin flight/qualification/durability testing. (\$233) - (U) Program Management Support. (\$276) <p>(U) <u>FY 1996 Planned Program</u></p> <ul style="list-style-type: none"> - (U) Complete qualification/durability testing. (\$300) - (U) Continue flight testing. (\$604) - (U) Acquire unique Support Equipment (SE). (\$2,482) - (U) Program Management Support. (\$300) <p>(U) <u>FY 1997 Planned Program</u></p> <ul style="list-style-type: none"> - (U) Mission Support. (\$300) - (U) Acquire unique (SE). (\$2,685) 											

Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#5 - Engineering and Manufacturing Development	#0604201F - Aircraft Avionics Equipment Development	Development - 4017	
B. (U) <u>Program Change Summary \$ in Thousands</u>			
	1994	1995	1996
Previous President's Budget	3,703	2,314	3,704
Appropriated Value	3,703		
Adjustments to Appropriated Value			
Below Threshold Reprogramming	-847		
Adjustments to Budget Years since FY95 PB			
Current Budget Submit/President's Budget	2,856	2,314	3,686
			-18
			2,985
			TBD
Change Summary Explanation:			
Funding: FY94 Below Threshold Realignment within PE 64201F to cover program priority requirements. FY96 and FY97 RDT&E reduced for non-pay purchases inflation. FY97 increased to complete qualification/durability testing.			
Schedule: No Changes			
Technical: No Changes			
C. (U) <u>Other Program Funding Summary (\$ in Thousands)</u>	Not Applicable		

Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY					PE NUMBER AND TITLE					PROJECT NO.			
#5 - Engineering and Manufacturing Development					#0604201F - Aircraft Avionics Equipment Development - 4017								

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)			DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE		PROJECT NO.
#5 - Engineering and Manufacturing Development		#0604201F - Aircraft Avionics Equipment Development		4017
A. (U) <u>Project Cost Breakdown (\$ in Thousands)</u>				
	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>
Primary Hardware Development	2,250	1,805	0	0
Developmental Test and Evaluation (DT&E)	232	233	904	0
Support Equipment Acquisition	0	0	2,482	2,685
Program Management Support	<u>374</u>	<u>276</u>	<u>300</u>	<u>300</u>
Total	2,856	2,314	3,686	2,985
B. (U) <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u> Not Applicable				

Exhibit R-3

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY				PE NUMBER AND TITLE						PROJECT NO.			
#5 - Engineering and Manufacturing Development				#0604201F - Aircraft Avionics Equipment Development - 2050									
COST (\$ in Thousands)				FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
2050 - Joint Helmet-Mounted Cueing System (JHMCS)				0	0	11,442	19,003	16,217	8,357	3,282	1,492	Continuing	TBD
<p>A. (U) <u>Mission Description and Budget Item Justification</u></p> <p>This Joint program with the USN will develop a helmet display system, capable of depicting aircraft heading data, pilots viewing perspective, target indication graphics and digital information. Consolidating this information on the pilot's visor allows the pilot to quickly align sensors and weapons on targets and engage threats using High Off-Boresight Angle (HOBAs) weapons such as the AIM-9X. The JHMCS includes a helmet with a mounted visor display capability, a helmet-vehicle interface cable, and several other components. JHMCS is currently in phase 0 (Concept Exploration). Demonstration/Validation and Engineering, Manufacturing and Development contracts will be awarded as full and open competition contracts.</p> <p>(U) <u>FY 1994</u> - Not Applicable</p> <p>(U) <u>FY 1995</u> - Not Applicable</p> <p>(U) <u>FY 1996 Planned Program</u></p> <ul style="list-style-type: none"> - (U) Initiate Interface Design and interface control documentation. (\$3,200) - (U) Perform integration analysis between the helmet and F-15 and F-18. (\$2,300) - (U) Request For Proposal (RFP) Development. (\$1,800) - (U) Demonstrate prototype concepts for Helmet alternatives. (\$2,700) - (U) Conduct cost benefit studies for Milestone II. (\$700) - (U) Program Management Support. (\$742) 													

Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE																																										
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.																																										
#5 - Engineering and Manufacturing Development	#0604201F - Aircraft Avionics Equipment Development	February 1995																																										
<p>A. (U) <u>Mission Description and Budget Item Justification (Cont.)</u></p> <ul style="list-style-type: none"> - (U) <u>FY 1997 Planned Program</u> - (U) Initiate Joint Helmet Mounted Cueing System (JHMCS) Engineering, Manufacturing and Development (EMD) (contract award). (\$13,500) - (U) Conduct Preliminary Design Review (PDR) and Critical Design Review (CDR). (\$1,500) - (U) Determine Maintenance concepts. (NSP) - (U) Initiate Support Equipment development. (\$1,900) - (U) Program Management Support. (\$2,103) <p>B. (U) <u>Program Change Summary (\$ in Thousands)</u></p> <table border="0"> <thead> <tr> <th></th> <th><u>1994</u></th> <th><u>1995</u></th> <th><u>1996</u></th> <th><u>1997</u></th> <th><u>Total Cost</u></th> </tr> </thead> <tbody> <tr> <td>Previous President's Budget</td> <td align="right">0</td> <td align="right">0</td> <td align="right">0</td> <td align="right">0</td> <td align="right">0</td> </tr> <tr> <td>Appropriated Value</td> <td align="right">0</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Adjustments to Appropriated Value</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>General Undistributed Reduction</td> <td align="right">0</td> <td></td> <td align="right">11,442</td> <td align="right">19,003</td> <td></td> </tr> <tr> <td>Adjustments to Budget Years since FY95PB</td> <td></td> <td></td> <td align="right">11,442</td> <td align="right">19,003</td> <td></td> </tr> <tr> <td>Current Budget Submit/President's Budget</td> <td align="right">0</td> <td align="right">0</td> <td></td> <td></td> <td align="right">TBD</td> </tr> </tbody> </table> <p>Change Summary Explanation:</p> <p>Funding: FY96 - FY97 funding added to meet requirement for a Helmet Mounted Cueing System as outline in the joint CAF - USN Mission Need Statement 308-93.</p> <p>Schedule: No Changes</p> <p>Technical: No Changes</p>				<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>Total Cost</u>	Previous President's Budget	0	0	0	0	0	Appropriated Value	0					Adjustments to Appropriated Value						General Undistributed Reduction	0		11,442	19,003		Adjustments to Budget Years since FY95PB			11,442	19,003		Current Budget Submit/President's Budget	0	0			TBD
	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>Total Cost</u>																																							
Previous President's Budget	0	0	0	0	0																																							
Appropriated Value	0																																											
Adjustments to Appropriated Value																																												
General Undistributed Reduction	0		11,442	19,003																																								
Adjustments to Budget Years since FY95PB			11,442	19,003																																								
Current Budget Submit/President's Budget	0	0			TBD																																							

Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.			
#5 - Engineering and Manufacturing Development		#0604201F - Aircraft Avionics Equipment Development - 2050											
C. (U) Other Program Funding Summary (\$ in Thousands) Not Applicable													
D. (U) Schedule Profile		1994		1995		1996		1997					
		1	2	3	4	1	2	3	4	1	2	3	4
- Mission Need Statement (MNS) Receipt		*											
- Joint Operational Requirements Document (JORD) development													
- Milestone 0 Acquisition													
Decision Memorandum (ADM)													
- Request For Proposal (RFP) release													
- Milestone I/II (EMD Contract Award)													
* - Completed Effort													
X - Planned Effort													

Exhibit R-2

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)			
BUDGET ACTIVITY		DATE	PROJECT NO.
#5 - Engineering and Manufacturing Development		#0604201F - Aircraft Avionics Equipment Development - 2050	
		PE NUMBER AND TITLE	
A. (U) Project Cost Breakdown (\$ in Thousands)			
	<u>1994</u>	<u>1995</u>	<u>1996</u>
Interface Design and integration	0		<u>1997</u>
Initiate EMD Contract Award	0	0	1,500
Request For Proposal	0	0	13,500
RFP Development	0	0	0
Helmet Demonstration	0	0	0
Program Management Support	0	0	2,103
Studies/Engineering	0	0	<u>1,900</u>
Total	0	0	19,003

Exhibit R-3

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE		February 1995																	
BUDGET ACTIVITY				PE NUMBER AND TITLE						PROJECT NO.																			
#5 - Engineering and Manufacturing Development				#0604201F - Aircraft Avionics Equipment Development - 2050																									
B. (U) Budget Acquisition History and Planning Information (\$ in Thousands)																													
Performing Organizations:																													
Contractor or Government Performing Activity		Contract Method/Type or Funding Vehicle		Award or Obligation Date		Performing Activity EAC		Project Office EAC		Total Prior to 1994		Budget 1994		Budget 1995		Budget 1996		Budget 1997		Budget to Complete		Total Program							
Product Development Organizations																													
TBD		TBD		TBD		TBD		TBD		0		0		0		8,900		14,250		Continuing		TBD							
Support and Management Organizations																													
Program Management Support				TBD		TBD		TBD		0		0		0		2,542		4,753		Continuing		TBD							
Test and Evaluation Organizations																													
TBD		TBD		TBD		TBD		TBD		0		0		0		0		0		Continuing		TBD							
TOTAL										0		0		0		11,442		19,003		Continuing		TBD							
Government Furnished Property:														TBD															

Exhibit R-3

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE									
#5 - Engineering and Manufacturing Development		#0604218F - Engine Model Derivative Program (EMDP)									
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Total Program Element (PE) Cost	841	739	756	739	772	810	834	859	CONT	CONT	
<p>A. (U) <u>Mission Description and Budget Item Justification</u></p> <p>(U) EMDP is an engineering development program that provides the latest engine technology advances to current weapon systems and provides a framework for engine development for future systems. EMDP contributes to system life extension, reduced life cycle cost, and enhanced performance. Enhanced performance is required to counter increases in system weight and increased threat capability. EMDP demonstrates derivative engine concepts incorporating advanced technology and components from government and contractor funded programs. EMDP demonstrates advances in performance, durability, operability, supportability, reliability, maintainability, and unique capabilities, such as thrust reversing and vectoring nozzles. These demonstrations are in prototype derivatives of existing engines prior to full scale development. Early demonstration of improved engine characteristics significantly reduces risk and shortens engine development and qualification, allowing quick, cost-effective response to weapon system needs. EMDP also evaluates candidate engines (commercial or military) to provide competitive engine opportunities. EMDP ensures the Air Force has propulsion alternatives to meet near- and far-term needs. EMDP plans for and sustains the engineering development necessary to provide increased performance, reduced life cycle cost and system life extension for air breathing engines for current and future systems. This Program is in Budget Activity/Research Category Engineering and Manufacturing Development because it applies advanced technology to existing engines to demonstrate possible performance improvements.</p> <p>(Dollars in Thousands)</p> <p>(U) <u>FY 1994 Accomplishments:</u></p> <p>(U) - Completed the F-15/16 Propulsion Roadmap Study. This study was commissioned by Air Combat Command (ACC) to provide propulsion options to first; address/deficiencies identified in the Strategic Attack/Interdiction, Close Air Support/ Interdiction and Air Superiority Mission Area Plans (MAPs) and second; reduce the operating and life cycle costs of the weapons systems. This effort began in Feb, 94 and was completed Jan 95. (\$616)</p> <p>(U) - Completed the Maverick Longhorn /Allison model 150 Engine Life Cycle Cost Study. This Study was commissioned by ACC and Aeronautical Systems Center (ASC) to provide options to reduce the development, acquisition and long term support costs of the Model 150 engine which can be applied to various tactical missile systems. The effort began in July 94 and was completed in Jan 95. (\$225)</p>											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE		February 1995
BUDGET ACTIVITY		
PE NUMBER AND TITLE		#0604218F - Engine Model Derivative Program (EMDP)
#5 - Engineering and Manufacturing Development		
<p>A. (U) Mission Description and Budget Item Justification (Cont.) (Dollars in Thousands)</p> <p>(U) FY 1995 Plans:</p> <p>(U) - Continue F-15/16 Road mapping efforts. (\$30)</p> <p>(U) - Air Mobility Command (AMC) Noise Suppression/Emission Control Studies - This effort will support AMC by evaluating the available options to meet the impending requirement of Part 36, Stage 3 Noise Compliance Federal Aviation Regulation, as well as European noise and emission standards. This will be done in conjunction with the ongoing Air Mobility Technology Planning Integrated Product Team. These efforts are required to accelerate road mapping of AMC propulsion systems in order to meet the implementation dates required for noise and emission standards. (\$269)</p> <p>(U) - C-130 Propulsion Roadmapping. This effort will support an ACC and SPD (System Program Director) request to provide and evaluate propulsion options for the C-130 aircraft fleet. The goals will be to first address deficiencies identified in the Air Mobility and Special Operations Forces Mission Area Plans, and second to reduce the cost of ownership and life cycle costs of the C-130 weapon systems. (\$440)</p> <p>(U) FY 1996 Plans:</p> <p>(U) - Road mapping Studies - These efforts are intended to assist the aircraft SPDs, engine System Support Managers (SSMs) and the using commands in developing a long term propulsion plan of enhancements, modifications, and upgrades to meet the unique requirements of each system. The F-111F study done in 1993 and the F-15/16 study just completed are examples of this type of program. The road mapping studies will consume the entire EMDP budget (as currently funded) in future years. Examples of candidate systems for evaluation include A-10, B-1, B-52, C-5, KC-10, C-130, KC-135, C-141, and T-38. (\$756)</p> <p>(U) FY 1997 Plans:</p> <p>(U) - (\$739) Continue Roadmapping Studies - Specifics TBD</p>		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE
BUDGET ACTIVITY		
#5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE	
	#0604218F - Engine Model Derivative Program (EMDP)	
B. (U) <u>Program Change Summary (\$ in Thousands)</u>		
Previous President's Budget	FY94	FY95
Appropriated Value	863	761
Adjustments to Appropriated Value	863	761
a. Cong Gen Reduction	-12	-8
b. SBIR	-10	-14
Current Budget Submit/President's Budget	841	739
		756
		743
		CONT
Change Summary Explanation:		
Funding:	Outyear funding reduced for inflation adjustments.	
Schedule:	None.	
Technical:	None.	
C. (U) <u>Other Program Funding Summary (\$ in Thousands)</u> : Not applicable.		
Related RDT&E:		
(U) - PE # 0603202F, Aircraft Propulsion Subsystem Integration, provides fan and low pressure turbine technology.		
(U) - PE # 0603216F, Advanced Turbine Engine Gas Generator, provides compressor, combustor, and high pressure turbine technology.		
(U) - PE # 0602203F, Aerospace Propulsion, provides additional component and engine test data.		
(U) - PE # 0708011F, Industrial Preparedness Program, provides materials processing and component fabrication demonstration.		
(U) - Activities conducted by the Army, Navy, National Aeronautics and Space Administration, and propulsion industry Independent Research and Development (IR&D).		
(U) - PE # 0604268F, Aircraft Engine Component Improvement Program, complements EMDP by addressing engine safety problems, service-revealed deficiencies, and improved reliability. This PE will change to #0207268F with submission of the FY97 President's Budget.		
(U) - The Air Force and Navy have a broad memorandum of understanding for joint cooperative propulsion programs in areas of common interest.		
(U) - There is no unnecessary duplication of effort within the Air Force or the Department of Defense.		
D. (U) <u>Schedule Profile</u> : Not applicable - On-going level-of-effort program.		

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Maj Borst/SAF/AQPF/4-3299/21 Jan

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE

February 1995

BUDGET ACTIVITY

#5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE

#0604218F - Engine Model Derivative Program (EMDP)

PROJECT

A. Project Cost Breakdown (\$ in Thousands)

TBD - Specific funding levels for FY96 are being developed. The major tasks will be Roadmapping studies by GE, P&W and Allison.

B. Budget Acquisition History and Planning Information (\$ in Thousands)**Performing Organizations:**

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
Product Development Organizations (\$ in Thousands)											
P & W	FFP	N/A	N/A	N/A	\$923	\$308	\$299	TBD	TBD	CONT	CONT
GE	FFP	N/A	N/A	N/A	\$830	\$308	\$0	TBD	TBD	CONT	CONT
Williams Int'l	FFP	N/A	N/A	N/A	\$215	\$0	\$0	TBD	TBD	CONT	CONT
Allison	FFP	N/A	N/A	N/A	\$369	\$225	\$440	TBD	TBD	CONT	CONT
Teledyne CAE	FFP	N/A	N/A	N/A	\$2,882	\$0	\$0	TBD	TBD	CONT	CONT
Allied Signal	FFP	N/A	N/A	N/A	\$186	\$0	\$0	TBD	TBD	CONT	CONT
Total					\$5,405	\$841	\$739	\$756	\$739	CONT	CONT

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Exhibit R-3

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE									
#5 Engineering and Manufacturing Development		#0604222F, Nuclear Weapons Support									
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Total Program Element (PE) Cost	5,365	5,609	4,822	4,855	4,834	4,813	5,008	5,074	Cont	Cont	
4236 Engineering Analysis	1,399	1,204	710	761	748	746	791	787	Cont	Cont	
5708 Nuclear Weapons Support	3,966	4,405	4,112	4,094	4,086	4,067	4,217	4,287	Cont	Cont	
A. (U) Mission Description and Budget Item Justification											
(U) Provides funds for maintaining core USAF nuclear weapon system expertise. Includes in-house technical capabilities, contractual efforts, supplies and equipment, travel, and salaries of the San Antonio Air Logistics Center, Product Group Manager for Nuclear Weapons, Nuclear Weapons Integration Division's civilian and military nuclear weapon specialists at Kirtland Air Force Base. Provides technical guidance for continued and improved weapons compatibility, interoperability, safety, surety, security, development, stockpile management and retirement. Customers are: DoD (Air Force, Navy and Defense Nuclear Agency [DNA]), DOE, and NATO. Supports US Strategic Command and Air Combat Command Required Operational Capability 16-71 (Peacekeeper), 12-76 (Air Launched Cruise Missile), 6-76 (B61 Strategic Bomb), 6-69 (B83 Modern Strategic Bomb), and SAC System Operational Requirements Documents 13-82-III (Advanced Cruise Missile). Air Force representative for development and implementation of the Joint DoD-DOE Surety Plan. This plan documents nuclear weapon issues which benefit from the application of risk assessment, data collection, and model development. The Nuclear Weapons Integration Division is responsible for all USAF nuclear weapons development, systems engineering, nuclear surety engineering and weapons support procedure changes. These efforts place this project in RDT&E research category/budget activity, Engineering and Manufacturing Development. This work is tied to the DOE nuclear weapons development process independent of the DoD acquisition system. Weapons are always undergoing some form of RDT&E to continually assure safety and reliability as the DoD restructures the nation's nuclear stockpile. Therefore, USAF platforms require continuing engineering development and analysis to ensure compatibility and safety of nuclear systems. Funding this element is essential to maintaining current safety and reliability levels in the US nuclear stockpile.											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE _____

February 1995

BUDGET ACTIVITY

#5 Engineering and Manufacturing Development

PE NUMBER AND TITLE

#0604222F, Nuclear Weapons Support

B. (U) Program Change Summary (\$ in Thousands)

Previous President's Budget

Appropriated Value

Adjustments to Appropriated Value

a. Congressional General Reductions

b. Reprogramming

Adjustments to Budget Years Since FY95 PB

Current Budget Submit/President's Budget

Change	Summary	Explanation
1. Increase in the number of employees	The number of employees has increased from 100 to 150.	This is due to the company's expansion into new markets and the hiring of additional staff to support the growth.
2. Decrease in the number of projects	The number of projects has decreased from 20 to 15.	This is due to the company's focus on completing existing projects and the cancellation of some less profitable ones.
3. Increase in the number of clients	The number of clients has increased from 50 to 75.	This is due to the company's aggressive marketing and sales efforts, which have resulted in a steady increase in new client acquisitions.
4. Decrease in the number of products	The number of products has decreased from 10 to 8.	This is due to the company's decision to discontinue some of its less popular products and focus on its core offerings.
5. Increase in the number of sales	The number of sales has increased from 1000 to 1200.	This is due to the company's improved sales strategy and the implementation of new sales channels.

Funding: Reduction in FY 96 and beyond due to a decrease in the AF inventory, no new weapon requirements and no new nuclear weapons in production.

Schedule: N/A

Technical: N/A

1994
5,445
5,475

-93
-17

5,365

$$\begin{array}{r} 1995 \\ 5,637 \\ 5,637 \end{array}$$

-28

-28

1996
5,793

-971
4,822

1997
5,825

Total	<u>Cost</u>	Cont
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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE
BUDGET ACTIVITY		PE NUMBER AND TITLE
#5 Engineering and Manufacturing Support		#0604222F, Nuclear Weapons Support
C. (U) Other Program Funding Summary (\$ in Thousands)		
Not Applicable		
Related RDT&E:		
- PE 0603851F, ICBM Modernization Dem/Val; PE0604851F, ICBM Modernization EMD.		
- PE 0101122F, Air Launched Cruise Missile; PE 0101120F, Advanced Cruise Missile (ACM).		
- PE 0101113F, B-52 Squadrons.		
- PE 0101118F, Short Range Attack Missile.		
- PE 0101126F, B-1B Squadrons; PE 0604240F, B-2 Adv Technology Bomber; PE 0101127F, B-2 Squadrons.		
- PE 0207130F/0207134F, F-15 A-D Squadrons/F-15E Squadrons.		
- PE 0207590F SEEK EAGLE		
D. (U) Schedule Profile		
Technical capabilities maintained for:		
Enduring Stockpile Weapons		
- B53 Strategic Bomb		
- W80-1 (ALCM, ACM)		
- B61-7, B83 Strategic Bombs		
- B61-3,4,10 (Tactical Bombs)		
- W78, W87 (Minuteman III and Peacekeeper)		
Inactive Stockpile (in Storage)		
- W84 (GLCM)		
Scheduled for Retirement		
- W69 (SRAM A) ¹		
- W62 (Minuteman III)		
Note 1: Weapons will remain in USAF custody pending DOE scheduling for shipment and dismantlement.		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY		PE NUMBER AND TITLE										DATE		PROJECT NO.	
#5 Engineering and Manufacturing Support		#0604222F, Nuclear Weapons Support										February 1995		4236	
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost					
Engineering Analysis	1,399	1,204	710	761	748	746	791	787	Cont	Cont					
<p>A. (U) <u>Mission Description and Budget Item Justification (\$ in Thousands)</u></p> <p>Funds the engineering analysis performed on contract for all new and fielded nuclear weapon systems. Contractors provide technical expertise unavailable through organic resources in critical areas of nuclear weapons safety and security. Projects and fund allocations have been adjusted to better accommodate reduced funding levels in future years.</p> <ul style="list-style-type: none"> (U) <u>FY 1994</u> - (U) Nuclear Aircraft System Support. Analyzed the Aircraft Monitor and Control (AMAC) software for the B-52 and F-16 software upgrades and provided technical expertise for continued nuclear weapons integration on US and non-US aircraft systems; formatted nuclear weapons loading, delivery, warhead mate and demate technical orders; supported the nuclear hardness data base; and began development of computer aided logistics support (CALS) interconnectivity between the Air Force and DOE for the Joint Nuclear Weapons Publication System (JNWPS). (\$350) - (U) Nuclear Weapons Program Support. Provided technical expertise to support development, fielding and updates of nuclear weapon stockpile-to-target sequences; documented and supported weapon safety analyses; documented and supported all weapon program actions, agreements, and program status; and provided technical support on accident-resistant shipping containers, use control, long-term storage and dismantlement issues to weapon Lead Project Officers. (\$745) - (U) Nuclear Weapons/Systems Assessments. Terminated development of system performance specification for the Nuclear Weapons Data Base (NWDB) to become a functional data base (lack of user interest); supported Phase 1 and 2 of Kirtland Underground Munitions Storage Complex (KUMSC) door seal analysis. (\$304) (U) <u>FY 1995</u> - (U) Nuclear Aircraft System Support. Revise and verify nuclear weapons loading, delivery, warhead mate and demate technical orders; provide support on the nuclear hardness data base; provide Aircraft Monitor and Control software analysis as required and technical expertise for continued nuclear weapons integration on US and non-US aircraft systems; continue to support development of USAF-DOE interconnectivity to JNWPS. (\$295) 															

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#5 Engineering and Manufacturing Support	#0604222F, Nuclear Weapons Support	4236	
<p>(U) <u>FY 1995 (Cont.)</u></p> <ul style="list-style-type: none">- (U) Nuclear Weapons Program Support. Provide technical expertise to support development, fielding and updates of nuclear weapon stockpile-to-target sequences; document and support weapon safety analyses; document and support all weapon program actions, agreements, and program status; and provide technical support on accident resistant shipping containers, use control, long-term storage and dismantlement to weapon Lead Project Officers. (\$659)- (U) Nuclear Weapons/Systems Assessments. Provide technical assessments and support on nuclear safety analyses and special studies including support of Phase 2 KUMSC door seal analysis. (\$250) <p>(U) <u>FY 1996</u></p> <ul style="list-style-type: none">- (U) Nuclear Aircraft System Support. Revise and verify nuclear weapons loading, delivery, warhead mate and demate technical orders; provide support on the nuclear hardness data base; and provide technical expertise for continued nuclear weapons integration on US and non-US aircraft systems; continue to support development of USAF-DOE interconnectivity to JNWPS. (\$213)- (U) Nuclear Weapons Program Support. Provide technical expertise to support development, fielding and updates of nuclear weapon stockpile-to-target sequences; document and support all weapons safety analyses; document and support all weapon program actions, agreements, and program status; provide technical support on accident resistant shipping containers, use control, long-term storage and dismantlement issues to weapon Lead Project Officers. (\$297)- (U) Nuclear Weapons/Systems Assessments. Provide technical assessments and support on nuclear safety analyses and special studies. (\$200) <p>(U) <u>FY 1997</u></p> <ul style="list-style-type: none">- (U) Nuclear Aircraft System Support. Revise and verify nuclear weapons loading, delivery, warhead mate and demate technical orders; provide support on the nuclear hardness data base; and provide technical expertise for continued nuclear weapons integration on US and non-US aircraft systems; continue to support development of USAF-DOE interconnectivity to JNWPS. (\$228)- (U) Nuclear Weapons Program Support. Provide technical expertise to support development, fielding and updates of nuclear weapon stockpile-to-target sequences; document and support all weapons safety analyses; document and support all weapon program actions, agreements, and program status; provide technical support on accident resistant shipping containers, use control, long term storage and dismantlement issues to weapon Lead Project Officers. (\$318)- (U) Nuclear Weapons/Systems Assessments. Provide technical assessments and support on nuclear safety analyses and special studies. (\$215)			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY		DATE		PROJECT NO.	
#5 Engineering and Manufacturing Support		February 1995		4236	
PE NUMBER AND TITLE		1994		1995	
#0604222F, Nuclear Weapons Support		1,145		1,204	
B. (U) Program Change Summary (\$ in Thousands)		1,145		1,204	
Previous President's Budget		1,145		1,204	
Appropriated Value		1,145		1,204	
Adjustments to Appropriated Value		+254		-554	
a. Realignment between BPAC 5708 and 4236		1,399		1,204	
Adjustments to Budget Years Since FY95 PB				-554	
Current Budget Submit/President's Budget				761	
Change Summary Explanation:				Total	
Funding: FY 94 BPAC realignment due to increased engineering support requirements. Reduction in FY 96 and beyond due to a decrease in the AF inventory, no new weapon requirements and no new nuclear weapons in production.				Cost	
Schedule: N/A				Cont	
Technical: N/A					
C. (U) Other Program Funding Summary (\$ in Thousands)					
Not Applicable					
Related RDT&E:					
- PE 0603851F, ICBM Modernization Dem/Val; PE0604851F, ICBM Modernization EMD.					
- PE 0101122F, Air Launched Cruise Missile; PE 0101120F, Advanced Cruise Missile (ACM).					
- PE 0101113F, B-52 Squadrons.					
- PE 0101118F, Short Range Attack Missile.					
- PE 0101126F, B-1B Squadrons; PE 0604240F, B-2 Adv Technology Bomber; PE 0101127F, B-2 Squadrons.					
- PE 0207130F/0207134F, F-15 A-D Squadrons/F-15E Squadrons.					
- PE 0207590F SEEK EAGLE.					
D. (U) Schedule Profile					
Not Applicable					

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1995	PROJECT NO.	4236
BUDGET ACTIVITY				PE NUMBER AND TITLE									
#5 Engineering and Manufacturing Support				#0604222F, Nuclear Weapons Support									
A. (U) Project Cost Breakdown (\$ in Thousands)													
Contractor Engineering Support				1994	1995	1996	1997						
				1,399	1,204	710	761						
Total				1,399	1,204	710	761						
B. (U) Budget Acquisition History and Planning Information (\$ in Thousands)													
Performing Organizations:													
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program		
Product Development Organizations													
Miscellaneous		NA	NA	NA	Cont.	1,399	1,204	710	761	Cont	Cont		
DOE/ALO, Albuquerque, NM													
Picatinney Arsenal, NJ													
TECH REPS, Inc, Albuquerque, NM													
Orion International, Albuquerque, NM													
Naval Air Warfare Center, Indianapolis, IN													
Oklahoma City Air Logistics Center, Tinker AFB, OK													
Silicon Graphics, Albuquerque, NM													
Support and Management Organizations													
None													
Test and Evaluation Organizations													
None													

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Exhibit R-2

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

February 1995

PE NUMBER AND TITLE

#0604222F, Nuclear Weapons Support

4236

Government Furnished Property: None

	Prior to 1994	Total Budget 1994
1. General Fund	100.00	100.00
2. State	0.00	0.00
3. Federal	0.00	0.00
4. Other	0.00	0.00
5. Total	100.00	100.00

Budget 1997	Budget to Complete	Total Program
----------------	-----------------------	------------------

**Budget
1996**

**Budget
1995**

**Budget
1994**

Prior to
1994

Subtotal Product Development

Subtotal Support and Management

Subtotal Test and Evaluation

Total Project

1,399

0

0

1,399

710

710

FOI

301

Cont

Cont

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT No.	
#5 Engineering and Manufacturing Support		#0604222F, Nuclear Weapons Support								5708	
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Nuclear Weapons Support	3,966	4,405	4,112	4,094	4,086	4,067	4,217	4,287	Cont	Cont	
<p>A. (U) <u>Mission Description and Budget Item Justification</u></p> <p>Funds San Antonio Air Logistic Center, Nuclear Weapons Integration Division's civilians providing technical support for all new and fielded USAF nuclear weapon systems. Projects and fund allocations have been adjusted to better accommodate reduced funding levels in future years.</p> <p>(U) <u>FY 1994</u></p> <ul style="list-style-type: none"> - (U) Nuclear Aircraft System Support. Developed H1473/H1545 cargo aircraft and ground handling constraint configurations; supported Nuclear Weapon System Safety Group (NWSSG) action items from the Prime Nuclear Airlift Force (PNAF) Special Safety Study; performed nuclear safety certification assessment of the Air Launched Cruise Missile operational flight software; conducted B-1B block 4.5m3 compatibility test; conducted F-16C/D block 40 tape 4 and block 50 tape 2 nuclear safety analysis; supported nuclear safety certification for F-111 aircraft and weapon systems, and design, development, standardization and procurement of stores management system for nuclear weapons command and control; supported US Strategic Command's nuclear safe escape effort; updated/expanded nuclear hardness data base and indexed nuclear weapons integration technical data; supported nuclear safety certification of C-5B, KC-10 and KC-135 for PNAF missions; provided nuclear surety design criteria, standards, specifications and related requirements documents for all USAF nuclear-capable aircraft weapon systems; continued C-17 nuclear safety certification efforts; revised and validated TO 1F-15E-16, Nuclear Weapons Information and Loading Procedures; completed nuclear safety evaluation of B-52H conventional enhancement modification; and began B-52H nuclear effects vulnerability analyses for sure safe delivery; terminated requirements analysis and system specification development effort for nuclear weapons data base comprised of aircraft compatibility and safety documents and the review of SEEK EAGLE certification package for adaption to nuclear requirements; supported an F-15E NWSSG Operational Safety Review; began to support the B-52H Weapon System Safety Assessment; assumed management of the B-52H Nuclear Project Officers Group; continued B-2A nuclear certification support; and directed a preliminary B-2A Aircraft Monitor and Control Test. (\$1,183) - (U) Nuclear Ground-Launched Missile Support. Supported START I and START II treaties; provided nuclear surety design criteria, standards, specifications and related requirements documents for all USAF ground-launched missile systems; performed safety analyses and independent evaluations for nuclear safety design certification of weapon system modifications; and supported NWSSG safety studies of major Minuteman modifications. (\$665) 											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

#5 Engineering and Manufacturing Support

#0604222F, Nuclear Weapons Support

5708

(U) FY 1994 (Cont.)

- (U) Nuclear Weapons Program Support. Continued High Power Radio Frequency (HPRF) Phase 2 study; accomplished nuclear weapon safety and compatibility studies, managed USAF nuclear weapon stockpile activities; supported weapon use control; participated in joint DoD/DOE Robust Warhead Assessment and other special studies; supported environmental and intrinsic radiation studies; collected data, analyzed, and characterized hazardous/radioactive waste materials generated during maintenance of special items and developed disposition policy and procedures; developed and fielded alternate storage procedures for reserve and retired systems; and continued support to USAF, DoD and other agencies in all facets of nuclear arsenal. (\$1,267)
- (U) Nuclear Weapons/Systems Assessments. Conducted a fault tree analysis of the B61 Inadvertent Nuclear Detonation Assessment; completed fault tree analyses of W80, W78/W87 weapons and B-2 systems; proposed revised Air Force Materiel Command nuclear policy; conducted KUMSC containment calculations of detonation by-products for existing blast door configuration; assisted DNA in PNAF portion of W78/W87 system safety study; developed joint DoD/DOE nuclear surety assessment methodology. (\$851)
- (U) FY 1995
- (U) Nuclear Aircraft System Support. Continue FY 1994 level of effort: continue support to US Strategic Command's nuclear safe escape effort; update/expand nuclear hardness data base; support NWSSG action items and Operational Safety Reviews as required; perform nuclear safety certification assessments; conduct nuclear safety analyses; support design, development, standardization and procurement of stores management system for nuclear weapons command and control; provide nuclear surety design criteria, standards, specifications and related requirements documents for all USAF nuclear-capable aircraft weapon systems; support the B-52H Weapon System Safety Assessment; manage the B-52H Nuclear Project Officers Group; develop software to institute the nuclear aircraft weapon system surveillance test program; continue C-17 nuclear safety certification efforts; perform an independent analysis of the B-1B block 4.8 Avionics Operational Flight Software for nuclear certification; direct a B-1B block 4.7 software Aircraft Monitor and Control Test. (\$1,300)
- (U) Nuclear Ground-Launched Missile Support. Continue FY 1994 level of effort: continue to support START I and START II treaties; provide nuclear surety design criteria, standards, specifications and related requirements documents for all USAF ground-launched missile systems; perform safety analyses and independent evaluations for nuclear safety design certification of weapons system modifications; support NWSSG safety studies. (\$750)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#5 Engineering and Manufacturing Support	#0604222F, Nuclear Weapons Support	5708	
(U) FY 1995 (Cont.)			
- (U)	Nuclear Weapons Program Support. Continue FY 1994 level of effort: complete and document HPRF Phase 2 study, initiate follow-on studies to HPRF in support of US Strategic Command; accomplish nuclear weapon safety and compatibility studies, support USAF nuclear weapon stockpile activities; conduct follow-on studies to the advanced weapons technology study; support non-proliferation technology studies; support DOE phase 1 and 2 studies and joint DoD/DOE special studies; support environmental and intrinsic radiation studies; continue support to USAF, DoD and other agencies in all facets of nuclear arsenal. (\$1,365)		
- (U)	Nuclear Weapons/Systems Assessments. Continue FY 1994 level of effort: continue to develop joint DoD/DOE nuclear surety assessment methodology; conduct fault tree analyses of W80 Inadvertent Nuclear Detonation study and for other nuclear weapons and weapon systems; provide other special assessments as required; and assist HQ DNA in B-52 Nuclear Weapons Assessment. (\$990)		
(U) FY 1996			
- (U)	Nuclear Aircraft System Support. Continue FY 1995 level of effort: continue support to US Strategic Command's nuclear safe escape effort; update/expand nuclear hardness data base; conduct nuclear aircraft weapon system surveillance test program; support NWSSG action items and Operational Safety Reviews as required; perform nuclear safety certification assessments; conduct nuclear safety analyses; support design, development, standardization and procurement of stores management system for nuclear weapons command and control; provide nuclear surety design criteria, standards specifications and related requirements documents for all USAF nuclear-capable aircraft weapon systems; manage the B-52H Nuclear Project Officers Group; complete analysis for C-17 nuclear safety certification; perform an independent analysis of B-2A block 20 software; and direct an Aircraft Monitor and Control Test. (\$1210)		
- (U)	Nuclear Ground-Launched Missile Support. Continue FY 1995 level of effort: continue to support START I and START II treaties; provide nuclear surety design criteria standards specifications and related requirements documents for all USAF ground-launched missile systems; perform safety analyses and independent evaluations for nuclear safety design certification of weapons system modifications; support NWSSG safety studies. (\$755)		
- (U)	Nuclear Weapons Program Support. Reduce FY 1995 level of effort in Advanced Concepts: accomplish nuclear weapon safety and compatibility studies, support USAF nuclear weapon stockpile activities and weapon use control analysis techniques; support non-proliferation technology studies; support environmental and intrinsic radiation studies; continue support to USAF, DoD and other agencies in all facets of nuclear arsenal. (\$1160)		
- (U)	Nuclear Weapons/Systems Assessments. Continue FY 1995 level of effort: continue to develop joint DoD/DOE nuclear surety assessment methodology; conduct fault tree analyses of nuclear weapons and weapon systems; provide other special assessments as required. (\$987)		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#5 Engineering and Manufacturing Support	#0604222F, Nuclear Weapons Support	5708	
(U) FY 1997			
- (U)	Nuclear Aircraft System Support. Continue FY 1996 level of effort: continue support to US Strategic Command's nuclear safe escape effort; update/expand nuclear hardness data base; conduct the nuclear aircraft weapon system surveillance test program; support NWSSG action items and Operational Safety Reviews as required; perform nuclear safety certification assessments; conduct nuclear safety analysis; support design, development, standardization and procurement of stores management system for nuclear weapons command and control; provide nuclear surety design criteria, standards specifications and related requirements documents for all USAF nuclear-capable aircraft weapon systems; perform an independent analysis of B-2A block 30 software and direct an Aircraft Monitor and Control Test. (\$1131)		
- (U)	Nuclear Ground-Launched Missile Support. Continue FY 1996 level of effort: continue to support START I and START II treaties; provide nuclear surety design criteria standards specifications and related requirements documents for all USAF ground-launched missile systems; perform safety analyses and independent evaluations for nuclear safety design certification of weapons system modifications; support NWSSG safety studies. (\$782)		
- (U)	Nuclear Weapons Program Support. Continue FY 1996 level of effort: accomplish nuclear weapon safety and compatibility studies, support USAF nuclear weapon stockpile activities and weapon use control analysis techniques; support nonproliferation technology studies; support environmental and intrinsic radiation studies; continue support to USAF, DoD and other agencies in all facets of nuclear arsenal. (\$1189)		
- (U)	Nuclear Weapons/Systems Assessments. Continue FY 1996 level of effort: continue to develop joint DoD/DOE nuclear surety assessment methodology; conduct fault tree analyses of nuclear weapons and weapon systems; provide other special assessments as required. (\$992)		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY		PROJECT NO.	
#5 Engineering and Manufacturing Support		#0604222F, Nuclear Weapons Support	
		5708	
B. (U) <u>Program Change Summary (\$ in Thousands)</u>			
Previous President's Budget	1994	1995	1996
Appropriated Value	4,300	4,433	4,529
Adjustments to Appropriated Value	4,330	4,433	4,510
a. Congressional General Reductions	-93	-28	
b. Reprogramming	-17		
c. Realignment between BPAC 5708 and 4236	-254		
Adjustments to Budget Years Since FY95 PB			
Current Budget Submit/President's Budget	3,966	4,405	4,112
			4,094
			Cont
Change Summary Explanation:			
Funding: FY 94 BPAC realignment due to increased engineering support requirements. Reduction in FY 96 and beyond due to a decrease in the AF inventory, no new weapon requirements and no new nuclear weapons in production.			
Schedule: N/A			
Technical: N/A			
C. (U) <u>Other Program Funding Summary (\$ in Thousands)</u>			
Not Applicable			
<u>Related RDT&E</u>			
- PE 0603851F, ICBM Modernization Dem/Val; PE0604851F, ICBM Modernization EMD.			
- PE 0101122F, Air Launched Cruise Missile; PE 0101120F, Advanced Cruise Missile (ACM).			
- PE 0101113F, B-52 Squadrons.			
- PE 0101118F, Short Range Attack Missile.			
- PE 0101126F, B-1B Squadrons; PE 0604240F, B-2 Adv Technology Bomber; PE 0101127F, B-2 Squadrons.			
- PE 0207130F/0207134F, F-15 A-D Squadrons/F-15E Squadrons.			
- PE 0207590F SEEK EAGLE.			
D. (U) <u>Schedule Profile</u>			
Not Applicable			

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

#5 Engineering and Manufacturing Support

#0604222F, Nuclear Weapons Support

5708

A. (U) Project Cost Breakdown (\$ in Thousands)

Program Management Personnel	1994 235	1995 240	1996 234	1997 234
Research Personnel	2,712	2,712	2,720	2,870
Travel	300	300	400	275
Training Development	130	150	150	150
Research Support Equipment Acquisition	178	400	145	125
Miscellaneous	411	603	463	440
Total	3,966	4,405	4,112	4,094

B. (U) Budget Acquisition History and Planning Information (\$ in Thousands)

Performing Organizations:

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
Product Development Organizations											
SA-ALC/NWI	Appr	NA	NA	NA	Cont	3,966	4,405	4,112	4,094	Cont	Cont
Support and Management Organizations											
None											
Test and Evaluation Organizations											
None											

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)					DATE	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE				
#5 Engineering and Manufacturing Support		#0604222F, Nuclear Weapons Support			5708	
B. (U) Budget Acquisition History and Planning Information Continued (\$ in Thousands)						
Government Furnished Property: None						
	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Total Program
Subtotal Product Development	Cont	3,966	4,405	4,112	4,094	Cont
Subtotal Support and Management						
Subtotal Test and Evaluation						
Total Project	Cont	3,966	4,405	4,112	4,094	Cont

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE										February 1995
BUDGET ACTIVITY										
PE NUMBER AND TITLE										
#5: Engineering and Manufacturing Development										
0604226F; B-1										
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	48,432	75,920	173,838	150,620	130,501	251,074	199,125	257,960	258,255	1,545,725
4143 Conventional Weapons Upgrade	48,432	73,467	155,922	106,539	81,750	160,040	139,547	162,280	195,239	1,123,216
1019 Electronic Countermeasures (ECM) Improvements	0	2,453	3,092	33,038	34,822	77,702	54,206	81,956	TBD	287,269
1020 Avionics/Weapon/Electronic (AW/E) Module for Air Force Mission Support System (AFMSS)	0	0	6,168	6,168	4,079	0	0	0	0	16,415
1021 B-1 Simulator	0	0	8,656	4,875	9,850	13,332	5,372	13,724	63,016	118,825
A. (U) Mission Description and Budget Item Justification										
<p>(U) With the drawdown of forward-based US ground, naval, and tactical air forces, current defense strategy calls for long range, conventionally armed strategic bombers to play a major role in the initial stages of a regional contingency. The procurement cap of B-2s and the reduced B-52 fleet make the B-1B Lancer the centerpiece of the bomber force -- B-1s will constitute half of all US strategic bombers. To maximize its contribution in this role, the Air Force must enhance the B-1's capability to perform precision attacks against moderately defended targets deep in enemy airspace. The needed enhancements fall primarily into two categories: improved lethality through integration of advanced conventional weapons and improved survivability through upgrades to the electronic countermeasures (ECM) system. The Air Force established the Conventional Mission Upgrade Program (CMUP) to fulfill these requirements.</p> <p>(U) This Program Element provides RDT&E funding for CMUP. The program integrates Cluster Bomb Units (CBUs), the Joint Direct Attack Munition (JDAM), and Joint Stand-Off Weapon (JSOW). Parallel and complimentary enhancements include upgrades to the existing ECM suite, an upgrade to the aircraft computer system necessary to handle the advanced weapons and ECM requirements, development of an interface to the Air Force standard mission planning system for more effective employment of the B-1 in a theater scenario, and upgrades to the air crew and maintenance training simulators to keep them consistent with the aircraft's configuration. The program includes work in both Research Category/Budget Activity Concept Demonstration and Validation (ECM, JSOW) and Engineering and Manufacturing Development (CBUs, JDAM, Computer), and is divided into four Projects as follows:</p>										

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE #5: Engineering and Manufacturing Development 0604226F; B-1	
<p>(U) Project 4143: The Conventional Weapons Upgrade Program (CWUP) supports B-1 capability enhancements to improve aircraft effectiveness in conventional operations. These improvements integrate conventional weapons (including advanced precision guided munitions) and upgrade the computer suite to handle the advanced weapons requirements (as well as significantly improving computer reliability and maintainability). Specific B-1 conventional modifications include integration of CBUs and Wind Corrected Munitions Dispenser (WCMD) kits (an ACAT III program), JDAM (ACAT ID), JSOW (ACAT ID), and aircraft enhancements necessary to carry these weapons. Aircraft enhancements included under the JDAM integration effort include: an anti-jam secure-voice radio (communications upgrade) for improved capability to operate within force packages, a Mil-Std-1760 electrical interconnection system which provides a common interface between different aircraft and precision weapons, Global Positioning System (GPS) capability for Congressionally directed navigation enhancements and providing required position updates to precision weapons, and a computer upgrade for improved weapons stores management (plus reliability and maintainability improvements).</p> <p>(U) Project 1019: The Defensive Systems Upgrade Program (DSUP), provides for Electronic Countermeasures (ECM) improvements needed to support B-1 conventional operations at medium to high altitudes in low to medium threat environments. The B-1 needs survivability enhancements in this regime to maximize effectiveness of the weapons capabilities provided under Project 4143. The DSUP is now restructured as an integrated and incremental program -- matching specific ECM improvements to mission requirements based on priority threats at discrete points in time. Priority threats will be those which the user determines are most critical to counter in a typical B-1 mission supporting Defensive Planning Guidance scenarios. These defensive system enhancements will concentrate on three areas: situational awareness, countermeasures effectiveness and reliability and maintainability.</p> <p>(U) Project 1020: This project provides improved B-1 mission planning capabilities by supplementing the ongoing Air Force Mission Support System (AFMSS) program with an aircraft specific software module. Automated mission planning systems traditionally have been developed and deployed by individual Air Force operating commands to support their assigned aircraft and weapons systems. The Air Force is now transitioning to a standard system, the AFMSS. While AFMSS provides common mission planning capabilities for all aircraft, the avionics, weapons and electrical (A/W/E) subsystems on each type aircraft require unique interfaces and functionality not provided by the AFMSS "core" system. This project provides those aircraft unique interfaces; the B-1 A/W/E software module will supplement the AFMSS core capabilities to achieve enhanced route planning, penetration, and weapons delivery capabilities. AFMSS replaces an aging mission planning system which is no longer fully supportable and does not meet current mission requirements. This A/W/E module will be developed concurrently with the AFMSS core software and the B-1 operational flight programs.</p>		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE February 1995
BUDGET ACTIVITY #5: Engineering and Manufacturing Development	PE NUMBER AND TITLE 06042226F; B-1	
<p>(U) Project 1021: This project provides updates to the existing training system necessary to match changes made to the aircraft described in the other projects. The total B-1 Training System (TS) consists of the Simulator System (SS) to train air crew members and Maintenance Training Equipment (MTE) to train maintenance personnel. The SS is actually a suite of systems which provides the necessary visual, motion and aural cues for complete ground training of B-1 air crew members -- there are 5 Weapon System Trainers, 5 Cockpit Procedure Trainers, 2 Mission Trainers, 1 Training System Support Center (TSSC) and 1 Data Base Transformation System (DBTS). The TSSC includes the computational system resources required to support software, hardware and firmware changes. The DBTS consists of transformation programs, commercial computers and printers located at the Defense Mapping Agency Aerospace Center, which provide terrain and feature updates. The MTE provides maintenance training for simulation of fault isolation and remove/replace of all B-1 aircraft systems. The MTE, also a suite of systems, includes 8 Avionics/Armament Maintenance Training Systems, 10 Simulator Maintenance Training Systems, 1 Primary/Secondary Flight Control System Maintenance Trainer and 1 TSSC to support software, hardware and firmware change.</p> <p>(U) Acquisition Strategy: These major projects will be accomplished during three phases through block upgrades. Phase I, "Enhanced Capability", contains the Block C upgrade consisting of CBU integration. Phase II, "Near Precision Capability," contains both Blocks D and E upgrades. Block D includes GPS, anti-jam secure voice radio, JDAM, and Mil-Std-1760 integration. Block E includes the computer, the first increment of DSUP, and WCMD upgrades. Additional DSUP increments will be incorporated into subsequent upgrade blocks. Phase III, "Standoff Capability," contains the Block F JSOW integration upgrade. AFMSS and Simulator upgrades will be released periodically during Phases I, II, and III. Ongoing sustainment software changes to the aircraft are now also being prioritized and phased into the appropriate "blocks" to maximize mission effectiveness and resource use.</p>		

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995						
BUDGET ACTIVITY		PE NUMBER AND TITLE							
#5: Engineering and Manufacturing Development		0604226F; B-1							
B. (U) <u>Program Change Summary (\$ in Thousands)</u>									
Previous President's Budget	1994	1995	1996	1997	Cost				
Appropriated Value	49,000	74,119	162,116	160,982	1,748,813				
Changes to Appropriated Value	49,000	74,119							
a. Congressional General Reduction		- 806							
b. SBIR	- 563	- 1,392							
c. Below Threshold Reprogramming	- 5	+ 3,999							
Adjustments to Budget Years Since FY95 PB			+11,722	-10,362					
Current Budget Submit/President's Budget	48,432	75,920	173,838	150,620	1,545,725				
(U) Change Summary Explanation:									
(U) Funding: See Project Level R-2 Exhibits.									
(U) Schedule: See Project Level R-2 Exhibits.									
(U) Technical: See Project Level R-2 Exhibits.									
C. (U) <u>Other Program Funding Summary (\$ in Thousands)</u>									
Aircraft Procurement, Air Force	To	Total	1996	1997	1998	1999	2000	2001	Cost
PE 11126F BP 11 B-1 Modifications	1994	1995							
AFMSS-PE 11126F		10,300	22,700	46,000	66,100	76,500	67,213	19,900	1,072,813
Appn 3400 O&M, PE 28006F			983	500	1,500	1,500			3,500
Appn 3080 Other Procurement, Budget Activity 83									983

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY		PE NUMBER AND TITLE							DATE	PROJECT NO.
#5 Engineering and Manufacturing Development		0604226F; B-1							February 1995	4143
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
4143 Conventional Weapons Upgrade	48,432	73,467	155,922	106,539	81,750	160,040	139,547	162,280	195,239	1,123,216

A. (U) Mission Description and Budget Item Justification

(U) The B-1 will deliver the lion's share of the heavy bomber fleet's conventional weapons in future conflicts. Current B-1 conventional combat capability is optimized for delivery of MK-82 non-precision 500 pound gravity bombs. Project 4143 provides RDT&E funding for increasing B-1 conventional weapons employment capability by upgrading the following systems:

- (U) CBUs: Modify some of the existing B-1 conventional bomb modules (now used only for MK-82 bombs) for integration of cluster bomb units (CBUs)
- (U) GPS: Incorporate Global Positioning System (GPS) capability for more precise long range navigation, TACAN emulation, and weapons delivery
- (U) Secure Communications: Integrate the ARC-210 "have quick" secure/anti-jam communications system for improved capability to operate within force packages
- (U) JDAM: Modify B-1 rotary launcher and develop interfaces for the Joint Direct Attack Munition (JDAM) and other advanced conventional weapons
- (U) Mil-Std-1760: Incorporate Mil-Std-1760 weapons interface required for use with JDAM and other future precision weapons
- (U) Computers: Upgrade the current avionics computer complex, which suffers from memory, throughput, and R&M limitations. A specific architecture will be selected in FY96. The goal is a modern avionics computer suite which provides expanded memory and throughput for enhanced fault isolation/detection, improved maintainability and improved stores management and growth capacity for the future advanced weapons
- (U) Advanced Munitions: Develop necessary modifications to integrate Joint Standoff Weapon (JSOW) and Follow-On Weapons.

(U) Acquisition Strategy: The conventional weapons upgrade program (CWUP) is accomplished in three phases. In each phase cost type contracts are used for EMD and fixed price contracts for production/mod kits:

- (U) Phase I: Enhanced capability (but unguided) weapons (CBU) integration
- (U) Phase II: Near precision weapons (JDAM) integration and Congressionally-directed demonstration of the feasibility of adding a GPS-aided targeting system (designated as the Relative Targeting System (RTS) on B-1). These are divided into three sub-phases:
 - (U) Phase IIA: Pre-EMD (design analyses, trade studies, engineering work leading up to the hardware preliminary design review)
 - (U) Phase IIB: EMD (Continued development effort through flight test, kit proof and physical configuration audit)
 - (U) Phase IIC: Production (modification kits)
- (U) Phase III: Precision weapons with standoff capability (JSOW/Follow-On Weapons)

(U) Rockwell International, El Segundo, CA, and the Boeing Company, Seattle, WA, are associate contractors for Phase I. The Air Force selected Rockwell International to be the integrating contractor to manage Phase II and Phase III upgrade. Rockwell International is the prime contractor for Phase II with the Boeing Company as their major team member. A sole-source contract for Phase IIB EMD is expected to be awarded to Rockwell in Mar 95.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE 06042226F; B-1	PROJECT NO. 4143
<p>#5 Engineering and Manufacturing Development</p> <p>(U) Government organizations responsible for development efforts include: the B-1 System Program Office (SPO) and Simulator Systems SPO at ASC, Wright-Patterson AFB, OH, and at Oklahoma City Air Logistics Center (OC-ALC), Tinker AFB, OK; Rome Laboratories, Griffiss AFB, NY; Warner Robins Air Logistics Center (WR-ALC), Robins AFB, GA; the Air Force Operational Test and Evaluation Center (AFOTEC), Kirtland AFB, NM; Air Force Flight Test Center, Edwards AFB, CA; JDAM/JSOW SPO, Eglin AFB, FL; GPS Joint SPO (JPO), Los Angeles AFB, CA; and AFMSS SPO, ESC, Hanscom AFB, Mass.</p> <p>(U) This project is categorized as Research Category EMD program because it is an operational weapon system with an ongoing development program which will upgrade conventional weapons capability.</p> <p>(U) <u>FY 1994</u></p> <ul style="list-style-type: none"> - (U) Conduct Congressionally-directed Relative Targeting System (RTS) demonstration (\$8,001) - (U) Continue Phase I activities for Cluster Bomb Unit (CBU) integration through Critical Design Review (CDR) and flight test planning (\$10,003) - (U) Continue Phase IIA pre-Engineering and Manufacturing Development (EMD) activities for Joint Direct Attack Munition (JDAM), Mil-Std-1760, Global Positioning System (GPS), and Communications (\$21,364) - (U) Simulator upgrades to keep the training system consistent with aircraft modifications prior to block B/C integration (\$1,209) - (U) Release RFP for Phase IIB (EMD) contract for prime contractor for integration of JDAM, Mil-Std-1760, GPS, and Secure Communications (\$0) - (U) Mission Support/Other (\$6,811) - (U) Continue instrumentation upgrade of the flight test aircraft and conduct ground tests (\$1,044) <p>(U) <u>FY 1995</u></p> <ul style="list-style-type: none"> - (U) Complete Phase I contract and flight test activities for CBUs (\$13,269) - (U) Simulator upgrades to keep the training system consistent with aircraft modifications prior to block B/C integration (\$4,300) - (U) Complete Phase IIA contract activities for JDAM, Mil-Std-1760, GPS and Communications Upgrade (\$4,851) - (U) Award Phase IIB (EMD) contract to prime contractor; begin development activities for integration of JDAM, Mil-Std-1760, GPS, and Secure Communications (\$45,784) - (U) Mission Support/Other (\$5,263) <p>(U) <u>FY 1996</u></p> <ul style="list-style-type: none"> - (U) Continue Phase IIB contract activities for JDAM, 1760, GPS and Secure Communications flight test planning (\$119,481) - (U) Engineering Change Proposal to Phase IIB contract for Wind Corrected Munitions Dispenser (WCMD) kit integration (\$2,500) - (U) Government flight test in support of Phase IIB (\$15,090) - (U) Mission Support/Other (\$18,851) 		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY		DATE	PROJECT NO.
#5 Engineering and Manufacturing Development		February 1995	4143
(U) FY 1997			
<ul style="list-style-type: none"> - (U) Continue Phase IIB contract activities for JDAM, 1760, GPS and Secure Communications. (\$62,815) - (U) Continue WCMD activities. (\$8,500) - (U) Government flight test in support of Phase IIB. (\$13,794) - (U) Mission Support/Other. (\$21,430) 			
B. (U) <u>Program Change Summary (\$ in Thousands)</u>			
Previous President's Budget	1994	1995	1996
Appropriated Value	49,000	71,619	130,016
Changes to Appropriated Value	49,000	71,619	
a. Congressional Reduction		- 806	
b. SBIR	- 563	- 1,345	
c. Below Threshold Reprogramming	- 5	+ 3,999	
Adjustments to Budget Years Since FY95 PB			
Current Budget Submit/President's Budget	48,432	73,467	+25,906
			155,922
			+7,757
			106,539
			1,123,216
(U) Change Summary Explanation:			
(U) Funding: FY95 \$24.9 million inflation adjustment was applied only to Project 4143. Subsequently, funds were realigned. Rates resulted in increases to FY00+ years not part of FY95 budget program (FY95-FY99).			
(U) Schedule: B-1/JDAM Integration efforts were pulled back to meet JDAM weapon DT&E and OT&E to support JDAM weapon LRIP and MSIII decisions.			
(U) Technical: The WCMD effort was added during AF POM process to replace the existing tail assembly with a modified fin assembly containing an inertial guidance element electronics package, fin actuator system, movable fins, and an electrical interface to the aircraft.			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995			
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.				
#5 Engineering and Manufacturing Development	0604226F; B-1	4143				
C. (U) <u>Other Program Funding Summary (\$ in Thousands)</u>						
		To	Total			
		1994	1995			
Aircraft Procurement, Air Force -		0	10,300			
B-1 Modifications			22,700			
			46,000			
		1997	1998			
		1999	2000			
		2001	2002			
		2003	2004			
		2005	2006			
		2007	2008			
		2009	2010			
		2011	2012			
		2013	2014			
		2015	2016			
		2017	2018			
		2019	2020			
		2021	2022			
		2023	2024			
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		2163	2164			
		2165	2166			
		2167	2168			
		2169	2170			
		2171	2172			
		2173	2174			
		2175	2176			
		2177	2178			
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		2197	2198			
		2199	2200			
		2201	2202			
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		2207	2208			
		2209	2210			
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		2239	2240			
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		2249	2250			
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		2653	2654			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)									
BUDGET ACTIVITY				PE NUMBER AND TITLE				DATE	PROJECT NO.
#5 Engineering and Manufacturing Development				0604226F; B-1				February 1995	4143
D. (U) <u>Schedule Profile</u>									
(U) Acquisition Milestones									
- (U) SSC MSII Decision									
- (U) Phase I EMD Complete									
- (U) Phase I RAA (CBU)									
- (U) Phase I FOC									
(U) Engineering Milestones									
- (U) Phase I CDR (CBU)									
- (U) Phase II PDR (GPS/COMMS, JDAM/1760)									
- (U) Phase II CDR (GPS/COMMS)									
- (U) Phase II CDR (JDAM/1760)									
(U) T&E Milestones									
- (U) Start Phase I CBU Flight Test									
- (U) Start Phase II GPS/COMMS Flight Test									
(U) Contract Milestones									
- (U) Phase II EMD									
- (U) Phase I Production									
- (U) Phase II Production (GPS/COMM)(Group A)									
- (U) Phase II Production (GPS/COMM) (Group B)									

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#5 Engineering and Manufacturing Development	0604226F; B-1	4143	
(U) <u>Milestones Beyond BY2</u>			
(U) Acquisition Milestones			
(U) Limited Operational Capability (GPS/COMMS)	2QFY99		
(U) Full Operational Capability (GPS/COMMS)	4QFY00		
(U) Limited Operational Capability (JDAM/1760)	1QFY01		
(U) Full Operational Capability (JDAM/1760)	3QFY02		
(U) Limited Operational Capability (Computer)	1QFY03		
(U) Limited Operational Capability (WCMD)	1QFY03		
(U) Limited Operational Capability (JSOW/Follow-on Weapons)	4QFY03		
(U) Full Operational Capability (WCMD)	1QFY05		
(U) Full Operational Capability (JSOW/Follow-on Weapons)	3QFY05		
(U) Full Operational Capability (Computer)	4QFY06		
(U) Engineering Milestones			
(U) Phase II CDR (Computer)	1QFY01		
(U) T&E Milestones			
(U) Begin Flight Test (GPS/COMM/JDAM/1760)	4QFY97		
(U) Complete Flight Test (GPS/COMM)	3QFY98		
(U) Begin Flight Test (Computer)	3QFY00		
(U) Begin Flight Test (WCMD)	3QFY00		
(U) Complete EMD/Flight Test (WCMD)	4QFY00		
(U) Complete Flight Test (Computer)	2QFY01		
(U) Begin Flight Test (JSOW/Follow-on Weapons)	TBD		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2)		DATE February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE 0604226F; B-1	PROJECT NO. 4143
#5 Engineering and Manufacturing Development		
<p>(U) Contract Milestones</p> <p>(U) Phase II Production (JDAM/1760) 2QFY99</p> <p>(U) Phase II Production (GPS/COMM) (Group A) 4QFY97</p> <p>(U) Phase II Production (GPS/COMM) (Group B) 2QFY97</p> <p>(U) Phase III EMD (JSOW/Follow-on Weapons) 3QFY99</p> <p>(U) Phase II Production (WCMD) 1QFY01</p> <p>(U) Phase II Production (Computer) 4QFY01</p> <p>(U) Phase III Production (JSOW/Follow-on Weapons) 4QFY02</p>		

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)			DATE	PROJECT NO.
BUDGET ACTIVITY	PE NUMBER AND TITLE			
#5 Engineering and Manufacturing Development	06042226F; B-1			4143
A. (U) Project Cost Breakdown (\$ in Thousands)				
(U) Major Contract:		1994	1995	1996
(U) Phase I		9,803	4,092	0
(U) Phase IIA		21,938	4,851	0
(U) Phase IIB		0	46,321	119,481
(U) RTS Demo		7,941	0	0
(U) Simulator Contract*		2,191	4,300	0
(U) WCMD		0	0	8,500
(U) Other Government Costs:				
(U) Government Test		1,232	8,640	15,090
(U) Mission Support/OGC		5,327	5,263	18,851
(U) Total		48,432	73,467	155,922
				106,539

* Note: The Simulator contract shown for FY94 and FY95 keeps the training system consistent with aircraft modifications prior to block B/C integration. The money for FY96 and FY97 is allocated under Project 1021.

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

#5 Engineering and Manufacturing Development

06042226F; B-1

4143

B. (U) Budget Acquisition History and Planning Information (\$ in Thousands)

Performing Organizations:

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
<u>Product Development Organizations</u>											
RI - CBUs	SS/CPFF	93	5,553	5,553	3,600	1,953	0	0	0	0	5,553
RI - CBUs	SS/CPFF	1/94	7,810	7,810	0	5,850	1,960	0	0	0	7,810
Boeing CBUs	SS/CPFF		5,795	5,795	1,500	2,200	2,132	0	0	0	5,832
RI-PH IIA	SS/CPAF	8/93	78,186	78,186	50,571	20,774	4,851	0	0	0	76,196
RI-PH IIB	SS/CPAF	3/95	N/A	N/A	0	0	42,024	116,098	71,315	163,566	393,003
LORAL/QT	C/CPAF	6/94	6,068	6,068	0	1,209	4,300	0	0	0	5,509
RI-RTS	SS/CPAF	8/94	8,591	8,591	0	8,591	0	0	0	0	8,591
RI-PHIII	SS/CPAF	TBD	TBD	TBD	0	0	0	0	0	327,040	327,040
<u>Support and Management Organizations</u>											
Various	Multiple	Various	N/A	N/A	0	0	0	9,245	8,957	63,443	81,645
Miscellaneous	Multiple	Various	N/A	N/A	1,666	6,811	8,060	9,606	8,742	65,394	100,279
<u>Test and Evaluation Organizations</u>											
AFFTC	P.O.	Various*	N/A	N/A	3,664	1,044	8,640	15,090	13,794	93,009	135,241

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE						PROJECT NO.			
#5 Engineering and Manufacturing Development		0604226F; B-1						4143			
B. (U) Budget Acquisition History and Planning Information Continued (\$ in Thousands)											
Government Furnished Property:											
Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program	
<u>Product Development Property</u>											
				0	0	1,500	5,883	3,731	26,404	37,518	
<u>Support and Management Property</u>											
				0	0	0	0	0	0	0	
<u>Test and Evaluation Property</u>											
				0	0	0	0	0	0	0	
Subtotal Product Development											
Subtotal Support and Management											
Subtotal Test and Evaluation											
Total Project											
;											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY		PE NUMBER AND TITLE							DATE	PROJECT NO.
#5 Engineering and Manufacturing Development		0604226F; B-1							February 1995	1019
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
1019 Electronic Countermeasures (ECM) Improvements	0	2,453	3,092	33,038	34,822	77,702	54,206	81,956	0	287,269

A. (U) Mission Description and Budget Item Justification

(U) The B-1's expanding conventional mission requires improved ECM capabilities for enhanced survivability at medium to high altitudes in modern air defense threat environments. The Defensive System Upgrade Program (DSUP) is now restructured as an integrated and incremental upgrade program -- matching specific ECM improvements to mission requirements based on priority threats at discrete points in time. Priority threats will be those which the user determines are most critical to counter in a typical B-1 mission supporting Defense Planning Guidance scenarios. Project 1019 provides RDT&E funding for improved B-1 ECM capabilities to address current deficiencies in situational awareness, jamming effectiveness and reliability and maintainability. Specific tasks include:

- (U) EMD planning. Funding requirements are being reviewed to support the restructured acquisition strategy.
- (U) Prioritization and mapping of requirements against specific mission scenarios (based on weapon integration accomplished under project 4143)
- (U) Selection and continued development of incremental solutions based on prioritized requirements

(U) Acquisition strategy: In FY93 the ECM project accomplished the risk reduction planning leading up to development of an RFP by the prime contractor (as system integrator) for the subcontractors during evaluation of candidate ECM solutions). Responding to Congressional restrictions in FY94 the Air Force stopped work on the ECM project except for completing studies underway to support the Cost and Operational Effectiveness Analysis (COEA). FY95 efforts focus on finalizing the incremental solutions and corresponding acquisition strategy with a goal of increasing commonality and capitalizing on technology improvements since the original program was developed.

(U) The Air Force selected Rockwell International to be the integrating contractor to manage B-1 upgrade efforts under project 1019. The subcontractor for the ECM upgrade will not be determined until the end of Source Selection in FY96.

(U) Government organizations responsible for various development efforts include: the B-1 System Program Office (SPO) at ASC, Wright-Patterson AFB, OH; Oklahoma City Air Logistics Center (OC-ALC), Tinker AFB, OK; Rome Laboratories, Griffiss AFB, NY; Air Force Electronic Warfare Evaluation Simulator, Dallas, TX; Warner Robins Air Logistics Center (WR-ALC), Robins AFB, GA; the Air Force Operational Test and Evaluation Center (AFOTEC), Kirtland AFB, NM; Air Force Flight Test Center, Edwards AFB, CA; and the Air Force Developmental Test Center (AFDTC), Eglin AFB, FL.

(U) The program is categorized as research category 6.5 (EMD). The B-1 is an operational weapon system; this ongoing development program upgrades its conventional capabilities.

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.
#5 Engineering and Manufacturing Development	0604226F; B-1	1019

<p>(U) <u>EY 1995</u></p> <ul style="list-style-type: none"> - (U) Resume Risk Reduction and planning for EMD for incremental upgrade program (\$975) - (U) Two SETA personnel to support additional EMD workload (\$250) - (U) Risk Reduction testing and demonstration in preparation for start of EMD (\$675) - (U) Mission Support/Other (\$553) <p>(U) <u>EY 1996</u></p> <ul style="list-style-type: none"> - (U) Continue Risk Reduction and planning for incremental upgrade program (\$2,000) - (U) Mission Support/Other (\$1,092) <p>(U) <u>EY 1997</u></p> <ul style="list-style-type: none"> - (U) Procurement of Group B (\$3,120) - (U) Rockwell's Integration and Group A Costs (\$12,060) - (U) Associate Contractor Agreement with AIL (\$2,160) - (U) Contractor System Test and Evaluation (\$5,040) - (U) Government Furnished Equipment (GFE) for Subcontractor Use. (\$4,000) - (U) Mission Support/Other (\$6,658) 	<p>;</p>
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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#5 Engineering and Manufacturing Development	0604226F; B-1	1019	
B. (U) Program Change Summary (\$ in Thousands)			
Previous President's Budget	<u>1994</u>	<u>1995</u>	<u>1996</u>
Appropriated Value	0	2,500	32,100
Adjustments to Appropriated Value	0	2,500	62,200
a. SBIR		- 47	
Adjustments to Budget Years Since FY95 PB		- 29,008	- 29,162
Current Budget Submit/President's Budget	0	3,092	33,038
			Total Cost
			648,193
(U) Change Summary Explanation:			
(U) Funding:			
- FY96 (-29,008):New Acquisition Strategy. Under the new strategy the system will be procured in increments. We will no longer do a full Risk Reduction where Rockwell was going to carry 3 subcontractors through risk reduction and later down-select to 1 subcontractor.			
- FY97 (-29,162):New Acquisition Strategy. We will start EMD in FY97 at a reduced level.			
(U) - Schedule: As a result of the new acquisition strategy we have moved EMD start from FY98 to FY97.			
(U) - Technical:Under the new strategy the performance of the first increment will be tailored to the expected threat in the year 2000. Follow-on performance will be tailored to the year 2010 and subsequent years.			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)									
BUDGET ACTIVITY					PE NUMBER AND TITLE				
#5 Engineering and Manufacturing Development					0604226F; B-1				
					PROJECT NO. 1019				
					DATE February 1995				

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)			DATE	PROJECT NO.
BUDGET ACTIVITY	PE NUMBER AND TITLE			
#5 Engineering and Manufacturing Development	0604226F; B-1			1019
A. (U) <u>Project Cost Breakdown (\$ in Thousands)</u>				
		1994	1995	1996
				1997
Part 1 : Requirements				
(U) Risk Reduction/Evaluation		0	1,650	0
(U) Contractor Group A & B		0	0	17,340
(U) Contractor System Test & Evaluation		0	0	5,040
(U) GFE		0	0	4,000
(U) OGC		0	803	6,658
(U) Support Contract		0	0	0
(U) Total		0	2,453	33,038

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE						PROJECT NO.			
#5 Engineering and Manufacturing Development		0604226F; B-1						1019			
B. (U) <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u>											
Performing Organizations:											
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
<u>Product Development Organizations</u>											
RI	SS/CPAF	Aug 93	TBD		6,000	0	975	2,000	0	0	8,975
RI	SS/CPAF	FY97	TBD						17,340	33,740	51,080
<u>Support and Management Organizations</u>											
Miscellaneous	Various	TBD	TBD		12,237	0	1,478	1,092	6,658	141,541	163,006
<u>Test and Evaluation Organizations</u>											
AFFTC	P.O.	Various*	TBD						5,040	65,405	70,445

* Note: P.O. provided to AFFTC annually for government flight test activities.

* Note: P.O. provided to AFFTC annually for government flight test activities.

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1995
BUDGET ACTIVITY			PE NUMBER AND TITLE				PROJECT NO.				
#5 Engineering and Manufacturing Development			0604226F; B-1				1019				
B. (U) <u>Budget Acquisition History and Planning Information Continued (\$ in Thousands)</u>											
Government Furnished Property:											
Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program	
<u>Product Development Property</u>											
Various	TBD	FY96	TBD	0	0	0	0	4,000	8,000	12,000	
<u>Support and Management Property</u>											
<u>Test and Evaluation Property</u>											
Subtotal Product Development											
Subtotal Support and Management											
Subtotal Test and Evaluation											
Total Project											
;											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)								DATE February 1995		
BUDGET ACTIVITY		PE NUMBER AND TITLE						PROJECT NO.		
#5 Engineering and Manufacturing Development		0604226F; B-1						1020		
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
1020 Aircraft/Weapon/Electronic (A/W/E) Module for Air Force Mission Support System (AFMSS)	0	0	6,168	6,168	4,079	0	0	0	0	16,415
<p>A. (U) Mission Description and Budget Item Justification</p> <p>(U) Automated mission planning systems traditionally have been developed and deployed by individual Air Force operating commands to support their assigned aircraft and weapons systems. The Tactical Air Forces (TAF) and the Strategic Air Commands (SAC), for example, began fielding mission support capabilities in various forms in the late 1970s, sometimes as extensions of avionics initialization systems already developed and in other cases as personal computer (PC), minicomputer or mainframe applications.</p> <p>(U) In the future, the Air Force will fulfill these requirements with the Air Force Mission Support System (AFMSS), a mission planning system that will be used throughout the Air Force to capitalize on commonly developed functionality. While the AFMSS core provides common mission planning capabilities, each aircraft or weapon system or electronic system (A/W/E) that uses AFMSS, requires specific mission planning functionality not provided by the AFMSS core. The B-1 A/W/E will supplement the AFMSS core capabilities and fulfill any B-1 specific mission planning requirements.</p> <p>(U) The B-1 currently uses the Mission Data Preparation System (MDPS). The MDPS will be replaced with AFMSS, currently under development by ESC, and the B-1 specific A/W/E module. The government will competitively procure the B-1 A/W/E software module and any necessary peripheral hardware to be hosted on or integrated with AFMSS. Full compatibility will require concurrent development with the evolutionary AFMSS core software, now scheduled for annual updates through FY98, and the aircraft OFPs, which are affected by aircraft changes such as those planned under the B-1B Conventional Mission Upgrade Program.</p> <p>(U) This program fulfills needs outlined in the B-1 Mission Need Statement (21 Aug 92) and Operational Requirements Document (22 Jan 93). As an interface component hosted on AFMSS, this program also responds to the Statement of Operational Need (SON) for a Strategic MDPS, Phase III (16 Feb 88) (SON 19-82). The AFMSS program implements TAF 312-87-1-B, System Operational Requirements Document (SORD) for TAF Mission Support System (with Military Airlift Command, SAC, TAF and United States Special Operations Command Annexes), 28 Sep 90.</p> <p>(U) The Government has awarded a contract for development of this A/W/E to Logicon.</p> <p>(U) Although ESC/YV will manage the development effort of the B-1 A/W/E, ASC/YD will retain PMD and funding authority of the program. Together, the organizations will report to AFPEO/ST, the B-1 PEO office.</p>										

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#5 Engineering and Manufacturing Development	0604226F; B-1	1020	

(U) The Government proposes a "two-release" procurement through FY97 with an option for follow-on software development related to OFP changes and any evolving B-1 mission planning requirements through FY99. In accordance with Integrated Weapon Systems Management (IWSM), the government plans to transition the program to an Air Logistics Center (ALC) to be determined later for management of follow-on organic support of the A/W/E software not earlier than FY98 (completion of Release 2) and no later than FY00.

(U) The first release under the basic contract will provide initial minimum planning capability functions for the B-1, covering approximately 50% of the user's requirements within 24 months of contract award. The second release will provide full functionality as currently defined. Both releases will include software development, training, special studies, and contractor technical support. The contract also has options for a third release and software maintenance.

(U) An award fee plan is structured to motivate the contractor to provide timely, high quality outputs that meet or exceed the minimum requirements, primarily in software design, development, and management while making maximum use of the AFMSS core. The award fee plan is further structured to encourage cost-effective design, development, and management of the software. Also included in the plan, but with much less emphasis, are special studies, training and maintenance. The award fee plan shall apply to this contract period and any future contractual periods, unless modified.

(U) ESC/YVP has awarded a cost-plus-award-fee (CPAF) contract to Logicon after a full-and-open competition and streamlined source selection.

(U) FY 1994

- (U) Not Applicable.

(U) FY 1995

- (U) Not Applicable. (FY 1995 funding will be provided from PE #0208006F)

(U) FY 1996

- (U) Continue Logicon contract development activities (\$4,200)
- (U) Mission Support/Other (\$1,968)

(U) FY 1997

- (U) Continue Logicon contract (\$4,200)
- (U) Mission Support/Other (\$1,968)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)					DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE		PROJECT NO.		
#5 Engineering and Manufacturing Development		0604226F; B-1		1020		
B. (U) <u>Program Change Summary (\$ in Thousands)</u>						
Previous President's Budget	1994	1995	1996	1997	Total	
Appropriated Value	N/A	N/A	N/A	N/A	Cost	N/A
Current Budget Submit/President's Budget	N/A *	*	6,168	6,168		16,415
(U) Change Summary Explanation:						
(U) Funding: New Project.						
(U) Schedule: New Project.						
(U) Technical: FY96 addition to support B-1 Aircraft/Weapons/Electronic integration with Air Force Mission Support System (AFMSS)						
C. (U) <u>Other Program Funding Summary (\$ in Thousands)</u>						
PE 28006F AFMSS RDT&E	1994	1995	1996	1997	1998	1999
	1,420	5,155	*	*	*	*
AFMSS-PE 11126F						
Appn 3400 O&M, PE 28006F				500	1,500	1,500
Appn 3080 Other Procurement, Budget Activity 83				983		983
(U) <u>Related RDT&E</u>						
- (U) Program Element #0208006F, Air Force Mission Support Systems (AFMSS)						
*Note: FY94 and FY95 activities were funded under the AFMSS program. FY96 and beyond activities are funded by B-1.						

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)									
BUDGET ACTIVITY					DATE				
#5 Engineering and Manufacturing Development					February 1995				
PE NUMBER AND TITLE					PROJECT NO.				
0604226F; B-1					1020				

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#5 Engineering and Manufacturing Development	06042226F; B-1	1020	
(U) <u>Milestones Beyond BY2</u>			
(U) Engineering Milestones			
(U) <u>A/W/E Release 3</u>			
- (U) Critical Design Review	1QFY98		
(U) <u>T&E Milestones</u>			
(U) <u>A/W/E Release 3</u>			
- (U) TRR	4QFY98		
(U) <u>Contract Milestones</u>			
- (U) Second S/W Release	1QFY98		
- (U) Third S/W Release	3QFY98		

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#5 Engineering and Manufacturing Development	0604226F; B-1	1020	
A. (U) <u>Project Cost Breakdown (\$ in Thousands)</u>			
	1994	1995	1996
(U) Contract Funding	0	0	4,200
(U) Other Government Costs	0	0	1,968
(U) Total	0	0	6,168
			1997
			4,200
			1,968
			6,168

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE					PROJECT NO.				
#5 Engineering and Manufacturing Development		06042226F; B-1					1020				
B. (U) <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u>											
Performing Organizations:											
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
<u>Product Development Organizations</u>											
LOGICON	CPAF	Aug 94	*	*	0	0	0	4,200	4,200	3,000	11,400
<u>Support and Management Organizations</u>											
Miscellaneous	Miscellaneous	Various			0	0	0	1,968	1,968	1,079	5,015
<u>Test and Evaluation Organizations</u>											
*NOTE: Funded Under The AFMSS Program, Program Element #02080006F.											

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)					DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE			PROJECT NO.	
#5 Engineering and Manufacturing Development		0604226F; B-1			1020	
B. (U) Budget Acquisition History and Planning Information Continued (\$ in Thousands)						
Government Furnished Property: N/A						
		Total				
		Prior to	Budget	Budget	Budget	Total
		1994	1994	1995	1996	1997
						Complete
						Program
	Subtotal Product Development	0	0	0	4,200	4,200
	Subtotal Support and Management	0	0	0	1,968	1,079
	Subtotal Test and Evaluation	0	0	0	0	0
	Total Project				6,168	4,079
						16,415
N/A - Two AFMSS developmental suites will be provided to the contractor. These suites have been purchased with B-1 funds and are in storage at OC-ALC.						
- Three Programmable Cartridge Transfer Units (PCTUs) will be provided to the contractor. The PCTUs are currently being manufactured by OC-ALC/LA and will be purchased with the FY94/FY95 funds ESC is applying to the program.						

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#5 Engineering and Manufacturing Development		06042226F; B-1								1021	
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
1021 B-1 Simulator	*	*	8,656	4,875	9,850	13,332	5,372	13,724	63,016	118,825	
<p>A. (U) Mission Description and Budget Item Justification</p> <p>(U) This project provides updates to the existing training system necessary to match changes made to the aircraft described in the preceding exhibits. The total B-1 Training System (TS) consists of the Simulator System (SS) to train air crew members and Maintenance Training Equipment (MTE) to train maintenance personnel. The SS is actually a suite of systems which provides the necessary visual, motion and aural cues for complete ground training of B-1 air crew members -- there are 5 Weapon System Trainers, 5 Cockpit Procedure Trainers, 2 Mission Trainers, 1 Training System Support Center (TSSC) and 1 Data Base Transformation System (DBTS). The TSSC includes the computational system resources required to support software, hardware and firmware changes. The DBTS consists of transformation programs, commercial computers and printers located at the Defense Mapping Agency Aerospace Center, which provide terrain and feature updates. The MTE provides maintenance training for simulation of fault isolation and remove/replace of all B-1 aircraft systems. The MTE, also a suite of systems, includes 8 Avionics/Armament Maintenance Training Systems, 10 Simulator Maintenance Training Systems, 1 Primary/Secondary Flight Control System Maintenance Trainer and 1 TSSC to support software, hardware, and firmware change.</p> <p>(U) Updates to the training system are necessary to maintain concurrency with the aircraft program. These updates are accomplished through block upgrades as dictated by the aircraft schedule.</p> <p>(U) Acquisition Strategy: The Loral-Quintron contract awarded 21 Jun 94 is a 5-year, 4 month contract. This contract encompasses development, production and CLS through FY99. The development portion is a Cost Plus Award Fee (CPAF) type contract and the production is Firm Fixed Price (FFP). The CLS is Fixed Price Award Fee (FPAF) for the simulator system and FFP for the Maintenance Training Equipment. It is Time and Materials for over and above work on both the Simulator System and MTE.</p> <p>*Note: Funding for the B-1 Simulator in FY94 and FY95 was \$3.8M and \$4.8M, respectively, and was funded under project 4143, Conventional Weapons Upgrade</p>											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#5 Engineering and Manufacturing Development	0604226F; B-1	1021	
<p>(U) <u>FY 1994</u> (Funded under Project 4143)</p> <p>(U) <u>FY 1995</u> (Funded under Project 4143)</p> <p>(U) <u>FY 1996</u></p> <ul style="list-style-type: none">- (U) Begin CPT development - Block B/C (\$4,471)- (U) Begin MTE - B/C (\$3,346)- (U) Award Fee Mar/Sep 96 (\$270)- (U) Mission Support/Other Activities (\$569) <p>(U) <u>FY 1997</u></p> <ul style="list-style-type: none">- (U) Begin Phase II (Block D) development (\$3,812)- (U) Award Fee Mar/Sep 97 (\$465)- (U) Mission Support/Other Activities (\$598)			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#5 Engineering and Manufacturing Development	0604226F; B-1	1021	
B. (U) Program Change Summary (\$ in Thousands)			
Previous President's Budget	1994 *	1995 *	1996 *
Appropriated Value			1997 *
Adjustments to Appropriated Value			
Current Budget Submit/President's Budget	*	*	8,656
			4,875
			118,825
(U) Change Summary Explanation:			
(U) Funding: The budget has been adjusted to reflect B-1 Training System/Trainers a separate project. Funding was moved from Projects 4143 and 1019.			
(U) Schedule: None.			
(U) Technical: None.			
C. (U) Other Program Funding Summary (\$ in Thousands)			
	To	1994	1995
	Total	1996	1997
		1998	1999
		2000	2001
			Cost
	None		Cost
Related RDT&E			
- (U) Program Element #0101126F, B-1 Squadrons			
- (U) Program Element #0305164F, Global Positioning System (GPS)			
- (U) Program Element #0604618F/N, Joint Direct Attack Munition (JDAM)			
- (U) Program Element #0604727F/N, Joint Stand-Off Weapon (JSOW)			
* Funded in Projects 4143 and 1019			

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<div>- (U) Program Element #0604604F, Wind Corrected Munitions Dispenser (WCMD) - - Funding will move into Program Element #0604600F, Wind Corrected Munitions Dispenser (WCMD), in FY96 - (U) Program Element #0208006F, Air Force Mission Support System (AFMSS) - (U) Program Element #0207130F, F-15 (Contributes to simulator IVACC). - (U) Program Element #0207133F, F-16 (Contributes to simulator IVACC).</div>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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<div>(U) <u>Acquisition Milestones</u> - (U) Start EMD - Block B/C - WST - (U) Start Production Block - B/C - WST - (U) First Delivery - WST - (U) Delivery MT - (U) Start EMD - Block B/C - CPT - (U) Start Production - B/C - CPT - (U) First Delivery - CPT - (U) Start EMD - B/C - MTE - (U) Start Production - B/C - MTE - (U) First Delivery - MTE - (U) Start EMD - Block D</div>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
<div>(U) <u>Engineering Milestones</u> - (U) SR Block B/C - WST (SRR) - (U) PDR Block B/C - WST - (U) CDR Block B/C - WST</div>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)									
BUDGET ACTIVITY					PE NUMBER AND TITLE				
#5 Engineering and Manufacturing Development					0604226F; B-1				
					PROJECT NO. 1021				
					DATE February 1995				

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)			DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.		
#5 Engineering and Manufacturing Development	0604226F; B-1	1021		
A. (U) Project Cost Breakdown (\$ in Thousands)				
Major Contract			1994	1995
(U) Block B/C				
- (U) WST				
- (U) CPT			0	0
				4,617
(U) Block D				
- (U) WST			0	0
- (U) CPT				
				4,277
(U) Maintenance Training Equipment				
(U) OGC			0	0
				3,470
				569
(U) Total			0	0
				8,656
				4,875

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE					PROJECT NO.				
#5 Engineering and Manufacturing Development		0604226F; B-1					1021				
B. (U) Budget Acquisition History and Planning Information (\$ in Thousands)											
Performing Organizations:											
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
Product Development Organizations											
Loral-Quintron	C/CPAF	Jun 94	*	N/A		*	*	8,087	4,277	99,410**	111,774
Support and Management Organizations											
Various						*	*	569	598	5,884**	7,051
Test and Evaluation Organizations											

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE				PROJECT NO.					
#5 Engineering and Manufacturing Development		0604226F; B-1				1021					
B. (U) Budget Acquisition History and Planning Information Continued (\$ in Thousands)											
Government Furnished Property: NONE REQUIRED											
Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program	
<u>Product Development Property</u>											
GFP not applicable to this program.											
<u>Support and Management Property</u>											
<u>Test and Evaluation Property</u>											
Subtotal Product Development											
Subtotal Support and Management											
Subtotal Test and Evaluation											
Total Project											
					8,087	4,277	99,410	111,774			
					569	598	5,884	7,051			
					8,656	4,875	105,294	118,825			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE									
#5 - Engineering and Manufacturing Development (EMD)		#0604227F Training Systems Development									
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Total Program Element (PE) Cost	19,485	13,690	8,786	4,650	4,848	6,177	6,365	6,562	Cont	TBD	
2325 Simulator Development Activities	3,000	1,778	1,677	1,531	1,577	2,741	2,818	2,900	Cont	TBD	
2769 Simulator Update Development	3,406	3,574	3,187	3,119	3,271	3,436	3,547	3,662	Cont	TBD	
3000 KC-135 Aircrew Training System	50	100	1,434	0	0	0	0	0	0	5,066	
3135 Advanced Training System	1,898	1,438	0	0	0	0	0	0	0	34,266	
4022 Simulator for Electronic Combat Training	6,820	6,800	2,488	0	0	0	0	0	0	25,820	
4156 AFSPC Training Development	16	0	0	0	0	0	0	0	0	208	
2851 STD DOD Sim Data Base	1,900	0	0	0	0	0	0	0	Program Complete	28,366	
3282 C-17 Aircrew Training System	25	0	0	0	0	0	0	0	Program Complete	73,793	
3772 C-141 Aircrew Training System	2,370	0	0	0	0	0	0	0	Program Complete	33,330	

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE																																																																														
BUDGET ACTIVITY	February 1995																																																																															
#5 - Engineering and Manufacturing Development (EMD)	#0604227F Training Systems Development																																																																															
<p>(U) A. <u>Mission Description and Budget Item Justification</u></p> <p>This is a continuing program element for development of aircrew and maintenance training techniques and devices. This program element is devoted to the Engineering and Manufacturing Development (EMD) of aircrew and maintenance training systems and is therefore included in research category (EMD). Objectives are to adapt simulation technology and standards developed in the laboratories and industry to satisfy MAJCOM training requirements, and to develop prototype training devices. Project 3135 - Advanced Training System (ATS) will be transferred to PE 0604243 (Manpower, Personnel, & Training) as of FY96. FY96 to FY98 funds will transfer with the program and become Project 4369 - Air Education and Training Management System. Funds for FY99 and outyears will remain in program element 64227, Project 2325 - Simulator Development Activities.</p> <p>(U) B. <u>Program Change Summary (\$ in Thousands)</u></p> <table border="1"> <thead> <tr> <th></th> <th>1994</th> <th>1995</th> <th>1996</th> <th>1997</th> <th>Total Cost</th> </tr> </thead> <tbody> <tr> <td>Previous President's Budget</td> <td>19,815</td> <td>14,261</td> <td>10,069</td> <td>8,005</td> <td>TBD</td> </tr> <tr> <td>Appropriated Value</td> <td>20,015</td> <td>14,261</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Adjustments to Appropriated Value</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> a. General Undistributed Reduction</td> <td>-429</td> <td>-306</td> <td></td> <td></td> <td></td> </tr> <tr> <td> b. Below Threshold Reprogrammings (BTR)</td> <td>-101</td> <td>-265</td> <td></td> <td></td> <td></td> </tr> <tr> <td> c. SBIR</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Adjustments to Budget years since FY95 PB</td> <td></td> <td></td> <td>-1,283</td> <td>-3,355</td> <td></td> </tr> <tr> <td>Current Budget Submit/President's Budget</td> <td>19,485</td> <td>13,690</td> <td>8,786</td> <td>4,650</td> <td>TBD</td> </tr> <tr> <td>Change Summary Explanation:</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> Funding: Project 4033 - JPATS Ground Based Training System (GBTS) funds for FY95-99 transferred to PE 64233F, Specialized Undergraduate Pilot Training (SUPT). FY95 Undistributed reduction: FFRDC, NON FFRDC, university research, travel. Outyears reflect non-pay purchases inflation</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> Schedule: Not Applicable</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> Technical: Not Applicable</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				1994	1995	1996	1997	Total Cost	Previous President's Budget	19,815	14,261	10,069	8,005	TBD	Appropriated Value	20,015	14,261				Adjustments to Appropriated Value						a. General Undistributed Reduction	-429	-306				b. Below Threshold Reprogrammings (BTR)	-101	-265				c. SBIR						Adjustments to Budget years since FY95 PB			-1,283	-3,355		Current Budget Submit/President's Budget	19,485	13,690	8,786	4,650	TBD	Change Summary Explanation:						Funding: Project 4033 - JPATS Ground Based Training System (GBTS) funds for FY95-99 transferred to PE 64233F, Specialized Undergraduate Pilot Training (SUPT). FY95 Undistributed reduction: FFRDC, NON FFRDC, university research, travel. Outyears reflect non-pay purchases inflation						Schedule: Not Applicable						Technical: Not Applicable					
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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY		PE NUMBER AND TITLE							DATE	PROJECT NO.	
#5 - Engineering and Manufacturing Development (EMD)		#0604227F Training Systems Development							February 1995	2325	
COST (\$ in Thousands)		FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
2325, Simulator Development Activities		3,000	1,778	1,677	1,531	1,577	2,741	2,818	2,900	Cont	TBD
<p>(U) A. <u>Mission Description and Budget Item Justification</u></p> <p>Provides the funds to conduct engineering development of new aircrew/maintenance training technologies and standards. Funds the pre-production of first article training devices to satisfy the customer's training requirements. Efforts currently planned or underway include using artificial intelligence techniques in the development of a generic Intelligent Training Management System (TMS). Structural Modeling, a set of software templates and specification forms for developing training device software, will also be developed.</p> <p>(U) <u>FY 1994 (\$ in Thousands)</u></p> <p>(U) - Structural Modeling (SM) continued support of Special Operations Forces Aircrew Training System, Simulator for Electronic Combat Training, and F-22 programs. Developed a SM test bed and core architecture. (\$1,900)</p> <p>(U) - The Intelligent TMS expanded the scheduling engine into a complete scheduling module. It was integrated into and tested with an existing TMS. (\$700)</p> <p>(U) - Began testing to determine the acuity of peripheral vision under dynamic conditions of Esprit Visual System. (\$200)</p> <p>(U) - Determined tradeoffs between Area of Interest (AOI) size and resolutions, blend region, and latency requirements of visual systems using the Esprit Visual System. (\$200)</p> <p>(U) <u>FY 1995 (\$ in Thousands)</u></p> <p>(U) - Complete development of the Structural Modeling (SM) core architecture. Continue support of programs using SM. (\$1,036)</p> <p>(U) - Continue development of objective measures for the transfer of training from the simulator to the aircraft. (\$237)</p> <p>(U) - Start evaluation, integration, and documentation of latest training technologies (SMART 2000). (\$138)</p> <p>(U) - Complete Peripheral Vision testing (\$200)</p> <p>(U) - Technical support (\$167)</p>											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995																																																						
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(U) - Continue evaluation, integration, and documentation of the latest training technologies (SMART 2000). (\$700)																																																									
(U) - Begin development of a prototype training system for demonstrating latest training system technology (SMART 2000). (\$377)																																																									
(U) <u>FY 1997 (\$ in Thousands)</u>																																																									
(U) - Assume responsibility for Universal Threat Simulator System (UTSS) from the Navy. Work to populate the data base and standards development will continue. (\$200)																																																									
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Change Summary Explanation:																																																									
Funding: FY94 budget limit, FY95/96/97 program scaled down Outyears reflect non-pay purchases inflation, FY95 \$1,586 BTR from 2325 into SECT due to underestimation of software development costs; FY95 GUR - FFRDC, NON FFRDC, travel, university research																																																									
Schedule: FY94 events slipped to FY95, FY96/97 program scaled down																																																									
Technical: Not Applicable																																																									

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	PROJECT NO.
BUDGET ACTIVITY	PE NUMBER AND TITLE		
#5 - Engineering and Manufacturing Development (EMD)	#0604227F Training Systems Development		2325
(U) A. <u>Project Cost Breakdown (\$ in Thousands)</u>			
		1994	1995
Structural Modeling		1,900	1,036
Intelligent Training Management System		700	0
Peripheral Vision Testing		200	0
Esprit Visual System Testing		200	200
Simulator Training Transfer		0	237
SMART 2000		0	138
Prototype Training Systems		0	0
Universal Threat Simulator System Standards Deviation			600
Technical support			731
			200
Total		3,000	1,778
			1,677
			1,531
			1997
			0
			0
			0
			0
			0
			600
			731
			200

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1995
BUDGET ACTIVITY										PROJECT NO.	
#5 - Engineering and Manufacturing Development (EMD)										#0604227F Training Systems Development	
(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)										2325	
Performing Organizations:											
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
<u>Product Development Organizations</u>											
Numerous	Various	Various	None	None	35,394	2,883	1,592	1,565	1,411	TBD	TBD
<u>Support and Management Organizations</u>											
The Training System Program Office, Aeronautical Systems Center, Wright-Patterson AFB OH											
Various	Various	Various	0	0	0	117	186	112	120	TBD	TBD
<u>Test and Evaluation Organizations</u> Not Applicable											
(U) B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)											
<u>Government Furnished Property: Not Applicable</u>											
Product Development Subtotal			None	None	35,394	2,883	1,592	1,565	1,411	TBD	TBD
Support and Management Subtotal			0	0	0	117	186	112	120	TBD	TBD
Total Project			None	None	35,394	3,000	1,778	1,677	1,531	TBD	TBD

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#5 - Engineering and Manufacturing Development (EMD)		#0604227F Training Systems Development								2769	
COST (\$ in Thousands)		FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
2769 Simulator Update Developments		3,406	3,574	3,187	3,119	3,271	3,436	3,547	3,662	Cont	TBD
<p>(U) A. <u>Mission Description and Budget Item Justification</u> Provides critical Training System Product Group (TSPG) support funding for multiple user commands products to include F-16 Weapon System Trainer, B-1B conventional upgrade, Simulator for Electronic Combat Training SECT, C-17 training suite, Universal Training Device, and C-141 Aircrew Training System. These support systems include a computer center, communications, Systems Engineering and Technical Assistance (SETA) contracting, travel, supplies, specialized training, and equipment.</p>											
<p>(U) FY 1994 (\$ in Thousands)</p> <ul style="list-style-type: none"> (U) Travel(\$600) (U) Communications(\$50) (U) Training(\$120) (U) SETA(\$750) (U) Management(\$825) (U) Computer center(\$500) (U) Supplies(\$200) (U) Equipment(\$157) (U) Miscellaneous(\$204) 											
<p>(U) FY 1995 (\$ in Thousands)</p> <ul style="list-style-type: none"> (U) Travel(\$623) (U) Communications(\$50) (U) Training(\$100) (U) SETA(\$815) 											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.
#5 - Engineering and Manufacturing Development (EMD)	#0604227F Training Systems Development	2769
<p>(U) <u>FY 1995 Continued (\$ in Thousands)</u></p> <p>(U) Management(\$947)</p> <p>(U) Computer center(\$470)</p> <p>(U) Supplies(\$199)</p> <p>(U) Equipment(\$128)</p> <p>(U) Miscellaneous(\$242)</p> <p>(U) <u>FY 1996 (\$ in Thousands)</u></p> <p>(U) Travel(\$506)</p> <p>(U) Communications(\$50)</p> <p>(U) Training(\$099)</p> <p>(U) Systems Engineering and Technical Assistance (SETA)(\$712)</p> <p>(U) Management(\$827)</p> <p>(U) Computer center(\$426)</p> <p>(U) Supplies(\$198)</p> <p>(U) Equipment(\$128)</p> <p>(U) Miscellaneous(\$241)</p> <p>(U) <u>FY 1997 (\$ in Thousands)</u></p> <p>(U) Travel(\$536)</p> <p>(U) Communications(\$44)</p> <p>(U) Training(\$88)</p> <p>(U) SETA(\$702)</p> <p>(U) Management(\$833)</p> <p>(U) Computer center(\$414)</p> <p>(U) Supplies(\$176)</p> <p>(U) Equipment(\$113)</p> <p>(U) Miscellaneous(\$213)</p>		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995						
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.		2769					
#5 - Engineering and Manufacturing Development (EMD)		#0604227F Training Systems Development							
(U) B. <u>Program Change Summary (\$ in Thousands)</u>									
Previous President's Budget	1994	1995	1996	1997	Total				
Appropriated Value	2,501	3,635	3,223	3,152	Cost				
Adjustments to Appropriated Value	3,406	3,635			TBD				
a. Congressional reductions	None								
b. Below Threshold Reprogramming (BTR)		-61							
Current Budget Submit/President's Budget	3,406	3,574	3,187	3,119	TBD				
Change Summary Explanation:									
Funding: Outyears Reflect non-pay purchases inflation; FY95 \$61K BTR into 4022 SECT due to underestimation of software development costs.									
Schedule: Not Applicable									
Technical: Not Applicable									
(U) C. <u>Other Program Funding Summary (\$ in Thousands)</u> Not Applicable									
(U) D. <u>Schedule Profile</u>									
(U) Travel	1	2	3	4	1994	1995	1996	1997	1997
(U) Communications									
(U) Training									
(U) SETA									
(U) Management									
(U) Computer center									
(U) Supplies									
(U) Equipment									
(U) Miscellaneous									

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February 1995
BUDGET ACTIVITY		PROJECT NO.	
#5 - Engineering and Manufacturing Development (EMD)		#0604227F Training Systems Development	
		2769	
(U) A. <u>Project Cost Breakdown (\$ in Thousands)</u>			
Travel	1994	1995	1996
Communications	600	623	506
Training	50	50	50
SETA	120	100	99
Management	750	815	712
Computer Center	825	947	827
Supplies	500	470	426
Equipment	200	199	198
Miscellaneous	157	128	128
	204	242	241
Total	3,406	3,574	3,187
			1997
			536
			44
			88
			702
			833
			414
			176
			113
			213
			3,119

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#5 - Engineering and Manufacturing Development (EMD)		#0604227F Training Systems Development								2769	
(U) B. <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u>											
Performing Organizations:											
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
<u>Product Development Organizations: Not Applicable</u>											
<u>Support and Management Organizations</u>											
The Training System Program Office (SPO), Aeronautical Systems Center, Wright-Patterson AFB OH;											
Various Various None 32,110 3,406 3,574 3,187 3,119 Cont TBD											
<u>Test and Evaluation Organizations Not Applicable</u>											
(U) B. <u>Budget Acquisition History and Planning Information Continued (\$ in Thousands) Not Applicable</u>											
Government Furnished Property: Not Applicable											
Subtotal Product Development		None		None		32,110		3,406		3,574	
Subtotal Support and Management		None		None		32,110		3,187		3,119	
Total Project		None		None		32,110		3,187		3,119	

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#5 - Engineering and Manufacturing Development (EMD)		#0604227F Training Systems Development								3000	
COST (\$ in Thousands)		FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
3000, KC-135 Aircrew Training System		50	100	1,434	0	0	0	0	0	0	5,066
<p>(U) A. <u>Mission Description and Budget Item Justification</u> Develops aircrew training devices and courseware for KC-135E, KC-135R, and C-135B aircrew members including Air National Guard (ANG) and Air Force Reserve (AFRES) components to satisfy continuation training requirements. Replaces current "blue-suit" instructors with contractor instructors.</p> <p>(U) <u>FY 1994</u> (\$ in Thousands) (U) - Mission Support. (\$50)</p> <p>(U) <u>FY 1995</u> (\$ in Thousands) (U) - Mission Support. (\$100)</p> <p>(U) <u>FY 1996</u> (\$ in Thousands) (U) - Develop replacement for KC-135 Weapon System Trainer (WST) navigation prototype station due to KC-135 WST elimination. (\$1,334) (U) - Mission Support. (\$100)</p> <p>(U) <u>FY 1997</u> Not Applicable.</p>											

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE _____

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

#5 - Engineering and Manufacturing Development (EMD)

#0604227F Training Systems Development

3000

(U) B. Program Change Summary (\$ in Thousands)

Total

Previous President's Budget	1,907
Appropriated Value	50
Adjustments to Appropriated Value	None
	<u>1994</u>

1995
1,438
1,438

1996
1.441

1997 0

- a. General Congressional reduction
- b. Below Threshold Reprogramming

Current Budget Submit/President's Budget

1.338

—

Change Summary Explanation:

Funding: FY95 \$1,338 BTR Into Simulator for Electronic Combat Training due to underestimation of software development costs, Outyears reflect non-pay purchase inflation. Program is complete in FY96.

Schedule: Not Applicable

Technical: Not Applicable

(U) C. Other Program Funding Summary (\$ in Thousands)
Aircraft Procurement, AF, Budget Activity 07,

	1994	1995	1996	1997	1998	1999	2000	2001	To Complete	Total Cost
Common Support Equipment	7,000	10,600	16,600	1,800	0	0	0	0	0	36,000

(U) D. Schedule Profile

1994

1
Navigator Weapon System Trainer development
Mission support

1995

1996

1997

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Exhibit R-2

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)									
DATE									
PROJECT NO.									
February 1995									
3000									
BUDGET ACTIVITY									
PE NUMBER AND TITLE									
#0604227F Training Systems Development									
#5 - Engineering and Manufacturing Development (EMD)									
(U) A. <u>Project Cost Breakdown (\$ in Thousands)</u>									
	1994	1995	1996	1997					
Navigator WST development			1,334						
Mission support	50	100	100	complete					
Total	50	100	1,434	complete					
(U) B. <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u>									
<u>Performing Organizations:</u>									
Contractor or									
Government									
Performing									
Activity									
Flight Safety Inc.									
Product Development Organizations Not Applicable									
Support and Management Organizations									
OG-LIRB & ASC/YWM	250	0	50	100	0	0	100	0	250
<u>Test and Evaluation Organizations Not Applicable</u>									
(U) B. <u>Budget Acquisition History and Planning Information Continued (\$ in Thousands) Not Applicable</u>									
<u>Government Furnished Property: Not Applicable</u>									
Subtotal product development	4,837	4,837	4,837	0	0	0	1,334	0	3,471
Subtotal Support and Management	250	250	250	50	100	0	100	0	250
Total Project	5,087	5,087	5,087	50	100	0	1,434	0	3,721

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE								
		February 1995								
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.								
#5 - Engineering and Manufacturing Development (EMD)	#0604227F Training Systems Development	4022								
COST (\$ In Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
4022, Simulator for Electronic Combat Training (SECT)	6,820	6,800	2,488	0	0	0	0	0	0	25,820
<p>(U) A. Mission Description and Budget Item Justification</p> <p>The SECT will replace outdated simulation devices that support Electronic Warfare Officer Training. The simulator will train students in basic threat recognition and associated electronic combat procedures in a simulated airborne environment. This training is possible only with simulation due to environment, security and range restrictions. This is a one-of-a-kind system with no scheduled production effort.</p> <p>(U) <u>FY 1994</u> (\$ in Thousands)</p> <p>(U) - Completed Critical Design Review (CDR) Readiness Assessment. (\$820)</p> <p>(U) - Completed CDR. (\$4,000)</p> <p>(U) - began system design and hardware/software development/integration. (\$2,000)</p> <p>(U) <u>FY 1995</u> (\$ in Thousands)</p> <p>(U) - Begin in-plant test of system. (\$1,200)</p> <p>(U) - Begin complete system code/unit test (\$2,423)</p> <p>(U) - Complete system design and hardware/software integration (\$3,177)</p> <p>(U) <u>FY 1996</u> (\$ in Thousands)</p> <p>(U) - Deploy and complete on-site test of system at Corey Station NTC FL (\$1,200)</p> <p>(U) - Complete hardware/software integration. (\$1,288)</p> <p>(U) <u>FY 1997</u> Not Applicable.</p>										

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

#5 - Engineering and Manufacturing Development (EMD)

#0604227F Training Systems Development

4022

(U) B. Program Change Summary (\$ in Thousands)

	1994	1995	1996	1997	Total Cost TBD
Previous President's Budget	451	3,638	95	0	
Appropriated Value	7,150	3,638			
Adjustments to Appropriated Value					
a. Congressional reductions	-330				
b. Below Threshold Reprogramming (BTR)		+3,162			
Adjustments to Budget years since FY95 PB			+2,393		
Current Budget Submit/President's Budget	6,820	6,800	2,488	0	25,820

Change Summary Explanation:

Funding: FY94 funding increase caused by requirements growth; FY95 \$3,162 BTR from 2325, 2769, 3000, and 4156; Outyears reflect non-pay purchases inflation

Schedule: Required Assets Available (RAA) date has moved to Aug 96 due to under estimation of software development time lines.

Technical: Technical Requirements have not changed

(U) C. Other Program Funding Summary (\$ in Thousands) Not Applicable(U) D. Schedule Profile

	1994			1995			1996			1997		
	1	2	3	4	1	2	3	4	1	2	3	4
Critical Design Review (CDR)												
Contractor Engineer Verification Review (CEVT)	X**											
Development Test & Eval (DT&E) / Sys Performance & Development Eval (SPADE)										X**		
Operational Test and Eval (OT & E) / Gov't Functional Mission Test										X**		
In-Plant test										X**		
Facilities Ready												
System Delivery (Required Assets Available)												X**

** = Completion

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#5 - Engineering and Manufacturing Development (EMD)	#0604227F Training Systems Development	4022	
(U) A. <u>Project Cost Breakdown (\$ in Thousands)</u>			
	<u>1994</u>	<u>1995</u>	<u>1996</u>
Complete Critical Design Review			
Readiness Assess	820		
Complete CDR	4,000		
Begin System Code & Unit Test	2,000		
Government In-Plant Test of System			
Complete System Code and Unit Test			
Complete Hardware Software Integration			
Deploy and Complete On-site Test of System			
Begin/Complete Hardware System Integration			
Total	6,820	6,800	2,488
			0

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1995
BUDGET ACTIVITY										PROJECT NO.	
PE NUMBER AND TITLE										4022	
#5 - Engineering and Manufacturing Development (EMD)										#0604227F Training Systems Development	
(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)											
Performing Organizations:											
Contract or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
Product Development Organizations											
AAI Corporation											
Huntvalley MD	C/CPAF	Apr 92	18,423	25,852	10,210	6,655	6,610	2,377	0	0	25,852
Support and Management Organizations											
ASC/YWMT											
Wright Patterson AFB OH				1,121	655	165	190	111	0	0	1,121
Test and Evaluation Organizations											
AFOTEC				1,682	1,682	0	0	0	0	0	1,682
(U) B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)											
Government Furnished Property: Not Applicable											
Subtotal Product Development			18,423	25,852	10,210	6,655	6,610	2,377	0	0	25,852
Subtotal Support and Management					655	165	190	111	0	0	1,121
Subtotal Test and Evaluation AFOTEC					1,682	0	0	0	0	0	1,682
Total Project					12,547	6,820	6,800	2,488	0	0	28,655

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995																																																											
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.																																																												
#5 - Engineering and Manufacturing Development (EMD)		#0604227F Training Systems Development								4156																																																												
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost																																																												
4156, AFSPC Training Development	16	0	0	0	0	0	0	0	0	208																																																												
<p>(U) A. <u>Mission Description and Budget Item Justification</u> This project consists of studies, up to and including Training System Requirements Analyses (TSRA), to determine Air Force Space Command (AFSPC) requirements for training systems and/or devices. The training systems and devices span all areas of AFSPC missions, including launch base operations, satellite command and control, surveillance, and early warning. (U) <u>FY 1994 (\$ in Thousands)</u> (U) - Provide training to AFSPC users of Launch Based Operations database. (\$16)</p> <p>(U) <u>FY 1995</u> Program complete, scope scaled down due to funding</p> <p>(U) B. <u>Program Change Summary (\$ in Thousands)</u></p> <table border="0"> <tr> <td>Previous President's Budget</td> <td>1994</td> <td>1995</td> <td>1996</td> <td>1997</td> <td>Total</td> </tr> <tr> <td>Appropriated Value</td> <td>234</td> <td>192</td> <td>480</td> <td>283</td> <td>Cost</td> </tr> <tr> <td>Adjustments to Appropriated Value</td> <td>16</td> <td>192</td> <td></td> <td></td> <td>TBD</td> </tr> <tr> <td>a. Congressional reductions</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>b. Below Threshold Reprogramming (BTR)</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Current Budget Submit/President's Budget</td> <td>16</td> <td>-192</td> <td>0</td> <td>0</td> <td>208</td> </tr> <tr> <td>Change Summary Explanation:</td> <td colspan="5">Funding: Program completed, scope scaled down due to funding; FY95 BTR into 4022 SECT due to underestimation of software development costs.</td> </tr> <tr> <td></td> <td colspan="5">Schedule: Not Applicable</td> </tr> <tr> <td>(U) C. <u>Other Program Funding Summary (\$ in Thousands)</u></td> <td colspan="5">Not Applicable</td> </tr> <tr> <td>(U) D. <u>Schedule Profile</u></td> <td colspan="5">Not Applicable</td> </tr> </table>											Previous President's Budget	1994	1995	1996	1997	Total	Appropriated Value	234	192	480	283	Cost	Adjustments to Appropriated Value	16	192			TBD	a. Congressional reductions						b. Below Threshold Reprogramming (BTR)						Current Budget Submit/President's Budget	16	-192	0	0	208	Change Summary Explanation:	Funding: Program completed, scope scaled down due to funding; FY95 BTR into 4022 SECT due to underestimation of software development costs.						Schedule: Not Applicable					(U) C. <u>Other Program Funding Summary (\$ in Thousands)</u>	Not Applicable					(U) D. <u>Schedule Profile</u>	Not Applicable				
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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE											
#5, Engineering and Manufacturing Development		0604231F, C-17 Program											
COST (\$ in Thousands)		FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost		
Total Program Element (PE) Cost		230,416	184,505	85,753	15,695	13,562	8,541	14,544	14,975	0	5,825,591		
<p>A. (U) <u>Mission Description and Budget Item Justification</u></p> <p>(U) Airlift provides the flexibility essential when responding to contingencies on short notice anywhere in the world. It is a major element of America's national security strategy and constitutes the most responsive means of meeting U.S. mobility requirements. Additional airlift capability is needed for rapid deployment of combat forces in support of national objectives. The congressionally mandated Mobility Requirements Study (MRS) forwarded to Congress on 23 Jan 92, once again validated the need for the C-17 aircraft. Specific tasks associated with the airlift mission area include deployment, employment (airland, airdrop, and extraction), sustaining support, retrograde, and combat redeployment. The C-17 is capable of performing the entire spectrum of airlift missions and is specifically designed to operate effectively and efficiently in both the strategic and theater environments. The vast increase in overall airlift capability provided by the C-17 is needed to replace the capabilities being lost as the C-141 retires from the Air Force inventory. The C-17 is capable of performing the airlift mission well into the 21st century. This program element is budgeted in Budget Activity/research category EMD because the program has completed Milestone II, is currently engaged in final stages of engineering development, and is in low rate production.</p> <p>(U) <u>FY 1994</u></p> <ul style="list-style-type: none"> - (U) Continue flight test program. (\$81,438) - (U) Continue Live Fire Test (LFT) program. (\$3,700) - (U) Continue developmental effort. (\$50,478) - (U) Implement USD(A&T) and MDA settlement. (\$94,800) <p>(U) <u>FY 1995</u></p> <ul style="list-style-type: none"> - (U) Complete LFT program; estimated completion date (ECD): 30 Sep 95. (\$2,300) - (U) Complete reliability, maintainability & availability (RM&A) evaluation; ECD: 4Q FY95. (\$12,000) - (U) Continue development effort. (\$108,805) - (U) Funding provided by OSD per USD(A&T) and MDA settlement agreement. (\$54,300) - (U) Begin 3rd life durability testing (\$7,100) 													

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE 0604231F, C-17 Program	
<p>#5, Engineering and Manufacturing Development</p> <p>(U) FY 1996</p> <ul style="list-style-type: none"> - (U) 3rd life durability test completion (\$11,000) - (U) Continue follow-on developmental effort (\$63,053) - (U) T-1 refurbishment (\$11,700) <p>(U) FY 1997</p> <ul style="list-style-type: none"> - (U) Continue follow-on product enhancements (\$15,695) <p>(U) Acquisition Strategy</p> <p>The Department of Defense has thoroughly studied the airlift issue, and has devised an integrated approach to meet airlift needs. The first element is to continue the C-17 program on a probationary basis to obtain 40 C-17s. If McDonnell Douglas Aerospace (MDA) proves during the probationary period that it can deliver quality aircraft, on time, at an affordable price, DoD will have successfully positioned itself to acquire additional C-17 aircraft. The second element of the airlift acquisition strategy is to expeditiously assess the capabilities of alternative aircraft and their likely cost. If MDA does not demonstrate its capabilities, or if the C-17 does not perform as required, DoD will decide by November 1995 on the number and type of alternative aircraft that it needs to meet overall airlift requirements. The key to the integrated strategy is procurement of eight C-17 aircraft in FY96 and implementation of the settlement agreement.</p> <p>A weapon system acquisition strategy is being developed to address the buy-out of the C-17 program. This strategy is based upon a 120-aircraft program and accommodates variations in quantity. Special provisions will adjust the prices in the event the total buy is other than 120 aircraft. Multiple contract vehicles are planned with prices for these contracts to be negotiated this summer to support the November 1995 Defense Acquisition Board (DAB) decision (contract award will not occur until after the DAB decision). The strategy will contain provisions for a multiyear procurement (per USD(A&T) direction, 2 Nov 94) in two phases and indemnification (because prices will be obtained for ten years into the future).</p>		

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE																																																																		
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<p>(U) Change Summary Explanation:</p> <p>Funding:</p> <ul style="list-style-type: none"> a. Excess advance procurement and spares funds were reprogrammed to RDT&E in FY94 in support of the settlement agreement. b. Program Office mission support funds have been shifted from RDT&E to procurement (APAF) in FY96 and out. This is a budget policy change. c. Air Force provided additional RDT&E funds in FY96 for flight test follow-on. <p>Schedule: The Milestone III decision has been rescheduled from Jul 95 to Nov 95. Initial Operational Capability (IOC) was declared on 17 Jan 95.</p> <p>Technical: The current USD(A&T)/MDA settlement agreement specifies further changes in the C-17 System Specification and the Prime Item Development Specification. The most significant changes, which are also Key Performance Parameters in the ORD are:</p> <table border="1"> <thead> <tr> <th>Capability</th> <th>Current Specification</th> <th>Proposed Specification</th> <th>ORD Threshold</th> </tr> </thead> <tbody> <tr> <td>Heavy logistics</td> <td>130,000 lbs/3,200 nm</td> <td>120,000 lbs/3,200 nm</td> <td>110,000 lbs/3,200 nm</td> </tr> <tr> <td>Max payload landing</td> <td>2,700 ft/167,027 lbs</td> <td>3,000 ft/157,000 lbs</td> <td>3,000 ft/140,000 lbs</td> </tr> <tr> <td>Backing up</td> <td>2% grade/167,027 lbs</td> <td>2% grade/157,000 lbs</td> <td>1.5% grade/160,000 lbs</td> </tr> </tbody> </table>			Capability	Current Specification	Proposed Specification	ORD Threshold	Heavy logistics	130,000 lbs/3,200 nm	120,000 lbs/3,200 nm	110,000 lbs/3,200 nm	Max payload landing	2,700 ft/167,027 lbs	3,000 ft/157,000 lbs	3,000 ft/140,000 lbs	Backing up	2% grade/167,027 lbs	2% grade/157,000 lbs	1.5% grade/160,000 lbs																																																		
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- c. Air Force provided additional RDT&E funds in FY96 for flight test follow-on.

Schedule: The Milestone III decision has been rescheduled from Jul 95 to Nov 95. Initial Operational Capability (IOC) was declared on 17 Jan 95.

Technical: The current USD(A&T)/MDA settlement agreement specifies further changes in the C-17 System Specification and the Prime Item Development Specification. The most significant changes, which are also Key Performance Parameters in the ORD are:

Capability	Current Specification	Proposed Specification	ORD Threshold
Heavy logistics	130,000 lbs/3,200 nm	120,000 lbs/3,200 nm	110,000 lbs/3,200 nm
Max payload landing	2,700 ft/167,027 lbs	3,000 ft/157,000 lbs	3,000 ft/140,000 lbs
Backing up	2% grade/167,027 lbs	2% grade/157,000 lbs	1.5% grade/160,000 lbs

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE									
#5, Engineering and Manufacturing Development		0604231F, C-17 Program									
C. (U) Other Program Funding Summary (\$ in Thousands)											
Information below is based on the purchase of 40 aircraft through FY96, the number to which DoD is currently committed. Approval of additional C-17s is dependent on the Defense Acquisition Board review of the program in November 1995.											
APAE Budget Activity 02 (Aircraft Quantity)	1994 2,086,231 (6)	1995 2,341,988 (6)	1996 2,402,490 (8)	1997 72,041 (0)	1998 74,836 (0)	1999 76,785 (0)	2000 75,189 (0)	2001 74,500 (0)	To Compl 0 (0)	Total Cost 14,311,311 (40)	
APAE Budget Activity 06 (Spares)	29,569	102,800	117,500	83,900	78,064	33,915	16,511	0	0	951,089	
APAE Budget Activity 05 (Mods)	3,472	6,065	12,687	24,411	22,226	5,033	855	318	0	75,067	
MilCon Budget Activity N/A	15,161	0	6,900	29,300	40,787	1,000	0	0	0	240,531	

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY		DATE											
#5, Engineering and Manufacturing Development		February 1995											
PE NUMBER AND TITLE		0604231F, C-17 Program											
D. (U)	Schedule Profile												
Acquisition Milestones:													
IOC		1	2	3	4	1	2	3	4	1	2	3	4
RM&A													
Milestone III													
Engineering Milestones:													
T&E Milestones:													
Static Article Test Complete													
Durability Article Test Complete (1st Lifetime)													
Durability Article Test Complete (2nd Lifetime)													
Durability Article Test Complete (3rd Lifetime)													
DT&E													
DlOT&E													
Live Fire Test Complete													
Contract Milestones:													
Lot VII Adv Proc (6 a/c)													
Lot VI (6 a/c)													
Lot VII (6 a/c)													
Lot VIII (8 a/c)													
Lot VIII Adv Proc (8 a/c)													
Other Program Milestones: N/A													

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#5, Engineering and Manufacturing Development	0604231F, C-17 Program		
A. (U) Project Cost Breakdown (\$ in Thousands)			
		<u>1994</u>	<u>1995</u>
Contractor Furnished Equipment		176,480	129,536
Training OGC		300	3,300
Test OGC		34,000	25,000
Mission Support OGC		15,620	20,149
Data OGC		1,900	3,000
Site Activation OGC		1,000	900
Miscellaneous		<u>1,116</u>	<u>2,620</u>
Total		230,416	184,505
			<u>1996</u>
			63,662
			1,500
			8,400
			10,400
			0
			800
			<u>991</u>
			85,753
			<u>1997</u>
			5,200
			0
			0
			9,197
			0
			300
			<u>998</u>
			15,695

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#5, Engineering and Manufacturing Development		0604231F, C-17 Program									
B. (U) Budget Acquisition History and Planning Information (\$ in Thousands)											
Performing Organizations:											
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
Product Development Organizations											
Douglas Aircraft F33657-81-C-2108	C,FPI/FP	8/31/81	5,339,098	5,339,098	4,958,800	176,480	129,536	63,662	5,200	5,395	5,339,073
Pratt & Whitney F33657-89-C-0032	C,FP	5/24/91	12,900	12,900	8,000	1,900	3,000	0	0	0	12,900
Douglas Aircraft F33657-89-C-0018	C,FPI	4/14/89	93,000	93,000	87,900	300	3,300	1,500	0	0	93,000
Support and Management Organizations											
Mission Support OGC	PO		0	0	64,600	15,620	20,149	10,400	9,197	45,427	165,666
Site Activation OGC	PO		0	0	1,300	1,000	900	800	300	800	5,100
Miscellaneous	PO		0	0	0	1,116	2,620	991	998	0	5,725
Test and Evaluation Organizations											
Combined Test Force (CTF)	PO		0	0	119,300	30,200	22,400	8,400	0	0	180,300
Live Fire Test	PO		0	0	5,500	3,700	2,300	0	0	0	11,500
Other	PO		0	0	12,200	100	300	0	0	0	12,600
Total					5,257,600	230,416	184,505	85,753	15,695	51,622	5,825,591
Government Furnished Property: N/A											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY										PE NUMBER AND TITLE	
#5, Engineering and Manufacturing Development										0604233F, Specialized Undergraduate Pilot Training (SUPT)	
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Total Program Element (PE) Cost	5,184	36,322	63,042	100,417	66,349	47,332	23,607	12,832	13,200	384,329	
T-1A Tanker-Transport Training System, 3853	2,205	188	0	0	0	0	0	0	0	15,233	
T-3A Enhanced Flight Screener, 4228	191	188	0	0	0	0	0	0	0	583	
Joint Primary Aircraft Training System, 4102	2,788	35,946	47,024	76,639	55,404	47,332	23,607	12,832	13,200	317,772	
T-38 Avionics Upgrade, 4376	0	0	16,018	23,778	10,945	0	0	0	0	50,741	
<p>(U) A. <u>Mission Description and Budget Item Justification</u></p> <p>Supports Air Education and Training Command's (AETC) implementation of Specialized Undergraduate Pilot Training (SUPT) and the Department of Defense initiative for joint pilot training. The T-1A is a derivative of the commercially available Beech 400A "Beechjet," missionized for the training role. The aircraft will accommodate an instructor and two students. The T-1A Ground Based Training System (GBTS) includes compatible simulators, mock-ups, courseware, syllabus, and student management and scheduling. The Tanker-Transport syllabus includes training in high and low altitude instrument approaches, crew coordination, asymmetric thrust situations, air-drop fundamentals, low-level navigation, airborne rendezvous, and cell formation. The T-3A Enhanced Flight Screener (EFS) will be used at the United States Air Force Academy and Hondo Field, Texas to standardize flight screening prior to SUPT. The aircraft is aerobically certified and has side-by-side seating, dual stick controls, dual throttles, and tricycle gear. The Joint Primary Aircraft Training System (JPATS) is a joint USAF/USN venture to replace the Services' fleets of primary trainer aircraft (T-37 and T-34 respectively) and associated GBTS. The Air Force is the lead or Executive Service. The T-38 Avionics Upgrade is planned as an integrated modernization of the T-38 and AT-38 cockpits to support mission ready bomber/fighter training. Since much of the work in this program element involves the missionizing of commercial aircraft and components, the category of research being performed is 6.5, Engineering and Manufacturing Development</p>											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE		
#5, Engineering and Manufacturing Development	0604233F, Specialized Undergraduate Pilot Training (SUPT)		
(U) B. <u>Program Change Summary (\$ in Thousands)</u>			
Previous President's Budget Appropriated Value	1994 5,604	1995 41,633	1996 85,395
Adjustments to Appropriated Value	5,604	37,433	
a. Cong Gen Reductions	-31	-408	
b. SBIR	-64	-703	
c. Omnibus or Other Above Threshold Reprogramming	-300		
d. Below Threshold Reprogramming	-25		
Adjustments to Budget Years Since FY95 PB		-22,353	19,455
Current Budget Submit/President's Budget	5,184	36,322	63,042
			100,417
			384,339
(U) Change Summary Explanation:			
(U) Funding: Establishment of a new project, T-38 Avionics Upgrade. FY95 reductions include undistributed congressional reductions and Small Business Innovation Research			
(U) Schedule: Delay JPATS manufacturing development contract award to Aug 95; accommodate restructured JPATS production program with slower ramp to a maximum quantity of 36 (vice 48) Air Force aircraft per year			
(U) Technical: Update JPATS Ground Based Training System (GBTS) to ORD II requirements			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995		
BUDGET ACTIVITY		PE NUMBER AND TITLE											
#5, Engineering and Manufacturing Development		0604233F, Specialized Undergraduate Pilot Training (SUPT)											
(U) C. <u>Other Program Funding Summary (\$ in Thousands)</u>													
		1994	1995	1996	1997	1998	1999	2000	2001	To Compl	Total Cost		
Aircraft Procurement, Air Force													
	T-1A TTTS	152,958	185,223	46,792	4945	0	0	0	0	0	1,039,872		
	T-3A Enhanced Flight Screener	11,511	0	0	0	0	0	0	0	0	41,113		
	JPATS	0	92,654	54,968	109,119	132,392	136,881	169,208	222,903	2,651,500	3,569,581		
	(Quantity)		(3)	(3)	(12)	(18)	(18)	(24)	(30)	(264)	(372)		
	T-38 Avionics Upgrade	0	0	0	0	31,321	128,913	118,244	124,063	249,059	651,600		
Aircraft Procurement, Navy, 0804745N, Undergraduate Pilot Training, 033900													
	JPATS	0	0	0	0	0	0	108,356	209,920	2,799,013	3,117,289		
	(Quantity)							(8)	(24)	(307)	(339)		
Military Construction, Air Force													
	JPATS	0	0	0	2,470	3,300	0	3,200	0	10,600	19,570		
Related RDT&E:													
	RDT&E, Navy, 0603208N, Training System Aircraft, H1150												
	JPATS	3,580	3,752	2,553	3,494	3,674	0	0	0	0	17,053		
(U) D. <u>Schedule Profile</u>													
			1994			1995		1996		1997			
		1	2	3	4	1	2	3	4	1	2	3	4
Reference individual project data													

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.			
#5, Engineering and Manufacturing Development		0604233F, Specialized Undergraduate Pilot Training								3853			
COST (\$ in Thousands)		FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost		
T-1A Tanker-Transport Training System		2,205	188	0	0	0	0	0	0	0	15,233		
<p>(U) A. <u>Mission Description and Budget Item Justification</u> The T-1A is a program to missionize a small business jet aircraft (Beech 400A) to implement the tanker-transport track of Specialized Undergraduate Pilot Training (SUPT).</p> <p>(U) <u>FY 1994</u> - (U) Provide mission support for operation of the T-1A System Program Office (\$2,205K)</p> <p>(U) <u>FY 1995</u> - (U) Provide mission support for operation of the T-1A System Program Office (188K)</p> <p>(U) <u>FY 1996</u> - (U) None</p> <p>(U) <u>FY 1997</u> - (U) None</p>													

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995	
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.		
#5, Engineering and Manufacturing Development	0604233F, Specialized Undergraduate Pilot Training	3853		
(U) B. <u>Program Change Summary (\$ in Thousands)</u>				
Previous President's Budget	1994	1995	1996	1997
Appropriated Value	2,205	2,188	0	0
Adjustments to Appropriated Value	2,205	188		
a. Cong Gen Reductions				
b. SBIR				
c. Omnibus or Other Above Threshold Reprogramming				
d. Below Threshold Reprogramming				
Adjustments to Budget Years Since FY95 PB				
Current Budget Submit/President's Budget	2,205	188	0	0
(U) Change Summary Explanation:				
(U) Funding: N/A				
(U) Schedule: N/A				
(U) Technical: N/A				
(U) C. <u>Other Program Funding Summary (\$ in Thousands)</u>				
Aircraft Procurement, Air Force	1994	1995	1996	1997
T-1A TTTS	152,958	185,223	46,792	4,845
(Quantity)	(35)	(32)	(0)	(0)
Related RDT&E: N/A				
			1998	1999
			0	0
			2000	2001
			0	0
			To	Total
			Compl	Cost
			0	1,039,872
				(180)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)									
BUDGET ACTIVITY					DATE				
#5, Engineering and Manufacturing Development					February 1995				
					PROJECT NO.				
					0604233F, Specialized Undergraduate Pilot Training 3853				
(U) D. Schedule Profile									
					PE NUMBER AND TITLE				
					</				

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#5, Engineering and Manufacturing Development	0604233F, Specialized Undergraduate Pilot Training	3853	
(U) A. Project Cost Breakdown (\$ in Thousands)			
	1994	1995	1996
			1997
Mission Support	2,205	188	0
Total	2,205	188	0

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1995
BUDGET ACTIVITY			PE NUMBER AND TITLE					PROJECT NO.			
#5, Engineering and Manufacturing Development			0604233F, Specialized Undergraduate Pilot Training					3853			
(U) B. <u>Budget Acquisition History and Planning Information (\$ in Thousands).</u>											
Performing Organizations:											
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Total Program	
<u>Product Development Organizations</u>											
N/A											
<u>Support and Management Organizations</u>											
Misc	Misc	Misc	N/A	N/A	12,840	2,205	188	0	0	15,233	
<u>Test and Evaluation Organizations</u>											
N/A											
Note: No RDT&E contract exceeds \$1 million.											

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February 1995	
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.		
#5, Engineering and Manufacturing Development	0604233F, Specialized Undergraduate Pilot Training	3853		
(U) B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)				
Government Furnished Property: N/A				
Subtotal Product Development	12,840	2,205	188	0
Subtotal Support and Management				15,233
Subtotal Test and Evaluation				
Total Project	12,840	2,205	188	0
				15,233

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#5, Engineering and Manufacturing Development		0604233F, Specialized Undergraduate Pilot Training								4228	
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
T-3A Enhanced Flight Screener	191	188	0	0	0	0	0	0	0	583	
<p>(U) A. <u>Mission Description and Budget Item Justification</u></p> <p>The T-3A Enhanced Flight Screener, a missionized Slingsby Firefly, is a more capable and maneuverable replacement for the aging T-41. The T-3A will provide a more thorough assessment of candidates' capabilities, lowering the washout rate in pilot training.</p> <p>(U) <u>EY 1994</u></p> <p>- (U) Provide mission support for the operation of the T-3A System Program Office (\$191K)</p> <p>(U) <u>EY 1995</u></p> <p>- (U) Provide mission support for the operation of the T-3A System Program Office (\$188K)</p> <p>(U) <u>EY 1996</u></p> <p>- (U) None</p> <p>(U) <u>EY 1997</u></p> <p>- (U) None</p>											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE		February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE		PROJECT NO.	
#5, Engineering and Manufacturing Development		0604233F, Specialized Undergraduate Pilot Training		4228	
(U) B. <u>Program Change Summary (\$ in Thousands).</u>					
Previous President's Budget		1994	1995	1996	1997
Appropriated Value		191	188	0	0
Adjustments to Appropriated Value		191	188		
a. Cong Gen Reductions					
b. SBIR					
c. Omnibus or Other Above Threshold Reprogramming					
d. Below Threshold Reprogramming					
Adjustments to Budget Years Since FY95 PB					
Current Budget Submit/President's Budget		191	188	0	0
(U) Change Summary Explanation:					
(U) Funding: N/A					
(U) Schedule: N/A					
(U) Technical: N/A					
(U) C. <u>Other Program Funding Summary (\$ in Thousands).</u>					
Aircraft Procurement, Air Force		1994	1995	1996	1997
T-3A Enhanced Flight Screener		11,511	0	0	0
(Quantity)		(33)			
Related RDT&E: N/A					
				1998	1999
				2000	2001
					To
					Compl
					Total
					Cost
					583
					42,043
					(113)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995			
BUDGET ACTIVITY					PE NUMBER AND TITLE					PROJECT NO.					
#5, Engineering and Manufacturing Development					0604233F, Specialized Undergraduate Pilot Training					4228					
(U) D. <u>Schedule Profile</u>															
Acquisition Milestones															
Engineering Milestones															
Functional/Physical Configuration Audits															
T&E Milestones															
Complete QOT&E															
Contract Milestones															
Production Certification (Plant)															
Other Program Events															
Required Assets Available (RAA) 28 Aircraft at Hondo															
RAA 29 Aircraft at USAF Academy															
FOC 56 Aircraft at USAF Academy															
FOC 57 Aircraft at Hondo															

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)									
BUDGET ACTIVITY				PE NUMBER AND TITLE			DATE		
#5, Engineering and Manufacturing Development				0604233F, Specialized Undergraduate Pilot Training			February 1995		
							PROJECT NO. 4228		
(U) A. <u>Project Cost Breakdown (\$ in Thousands)</u>									
				<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>		
Mission Support				191	188	0	0		
Total				191	188	0	0		
(U) B. <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u>									
<u>Performing Organizations:</u>									
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget to Complete
<u>Product Development Organizations</u>									
N/A									
<u>Support and Management Organizations</u>									
Misc	Misc	Misc	N/A	N/A	204	191	188	0	0
<u>Test and Evaluation Organizations</u>									
N/A									
Note: No RDT&E contract exceeds \$1 million.									

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February 1995			
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.				
#5, Engineering and Manufacturing Development	0604233F, Specialized Undergraduate Pilot Training	4228				
(U) B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)						
Government Furnished Property: N/A						
Subtotal Product Development	204	191	188	0	0	583
Subtotal Support and Management						
Subtotal Test and Evaluation						
Total Project	204	191	188	0	0	583

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY				PE NUMBER AND TITLE						PROJECT NO.			
#5, Engineering and Manufacturing Development				0604233F, Specialized Undergraduate Pilot Training						4102			
COST (\$ in Thousands)				FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Joint Primary Aircraft Training System (JPATS)				2,788	35,946	47,024	76,639	55,404	47,332	23,607	12,832	13,200	317,772
<p>(U) A. <u>Mission Description and Budget Item Justification</u></p> <p>The Joint Primary Aircraft Training System (JPATS) is a joint USAF/USN venture to replace the Services' fleets of primary trainer aircraft (T-37 and T-34 respectively) and associated Ground Based Training Systems (GBTS). The aircraft and GBTS will be used to train entry level student aviators in the fundamentals of flying so they can transition into advanced tracks leading to qualification as military pilots, navigators, and Naval Flight officers. The program includes the purchase of aircraft, simulators, and other associated ground-based training devices, training management systems, instructional courseware, and logistics support. Funding reflects the requirements of the Sep 93 Operational Requirements Document.</p> <p>(U) <u>FY 1994</u></p> <ul style="list-style-type: none"> - (U) Released JPATS acquisition Request for Proposal May 94; began aircraft Source Selection including candidate flight evaluations Jul 94; completed Acquisition Decision Memorandum (ADM)-directed Streamlining Working Group review; acquired/modified test dummies to support DOD-directed, expanded anthropometric requirements; completed Ground Based Training System (GBTS) baseline package (\$2,788K) <p>(U) <u>FY 1995</u></p> <ul style="list-style-type: none"> - (U) Award acquisition contract for manufacturing development phase (\$33,446K) - (U) Begin GBTS Contract Change Proposal, and mission support (\$2,500K) <p>(U) <u>FY 1996</u></p> <ul style="list-style-type: none"> - (U) Modify contract to support GBTS development (\$1,600K) - (U) Begin escape system and birdstrike testing; continue Airframe Structural Integrity Program (ASIP) and Engine Structural Integrity Program (ENSIP); and continue missionization (\$43,624K) - (U) Mission support (\$1,800K) 													

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#5, Engineering and Manufacturing Development	0604233F, Specialized Undergraduate Pilot Training	4102	
(U) FY 1997			
- (U) Complete first aircraft and begin flight test, continue GBTS development (\$74,839K)			
- (U) Mission support (\$1,800K)			
(U) B. Program Change Summary (\$ in Thousands)			
		1994	1995
Previous President's Budget		3,208	39,257
Appropriated Value		3,208	37,057
Adjustments to Appropriated Value		-420	-1,111
a. Cong Gen Reductions		-31	-408
b. SBIR		-64	-703
c. Omnibus or Other Above Threshold Reprogramming		-300	
d. Below Threshold Reprogramming		-25	
Adjustments to Budget Years Since FY95 PB			
Current Budget Submit/President's Budget		2,788	35,946
			-22,353
			19,455
			76,639
			317,772
(U) Change Summary Explanation:			
(U) Funding: FY95 reflects undistributed congressional reductions and Small Business Innovation Research (SBIR). Other changes are reflected in schedule and technical changes along with inflation adjustments			
(U) Schedule: Delay manufacturing development contract award to Aug 95; accommodate program with slower ramp up to a maximum production rate of 36 (vice 48) Air Force aircraft per year			
(U) Technical: Update of GBTS to ORD II requirements			
		1996	1997
		85,395	80,962
			Total Cost
			285,000

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995		
BUDGET ACTIVITY			PE NUMBER AND TITLE								PROJECT NO.			
#5, Engineering and Manufacturing Development			0604233F, Specialized Undergraduate Pilot Training								4102			
(U) C. Other Program Funding Summary (\$ in Thousands)														
Aircraft Procurement, Air Force JPATS (Quantity)			1994	1995	1996	1997	1998	1999	2000	2001	To Compl	Total Cost		
			0	92,610 (3)	54,968 (3)	109,119 (12)	132,392 (18)	136,881 (18)	169,208 (24)	222,903 (30)	2,651,500 (264)	3,569,581 (372)		
Aircraft Procurement, Navy, 0804745N, Undergraduate Pilot Training, 033900 JPATS (Quantity)			0	0	0	0	0	0	108,356 (8)	209,920 (24)	2,799,013 (307)	3,117,289 (339)		
Military Construction, Air Force JPATS			0	0	0	2,470	3,300	0	3,200	0	10,600	19,570		
Related RDT&E:														
RDT&E, Navy, 0603208N, Training System Aircraft, H1150 JPATS			3,580	3,752	2,553	3,494	3,674	0	0	0	0	17,053		

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE _____

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

#5, Engineering and Manufacturing Development

0604233F, Specialized Undergraduate Pilot Training

4102

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)			DATE	PROJECT NO.
BUDGET ACTIVITY	PE NUMBER AND TITLE			
#5, Engineering and Manufacturing Development	0604233F, Specialized Undergraduate Pilot Training		4102	
(U) A. <u>Project Cost Breakdown (\$ in Thousands)</u>				
	1994	1995	1996	1997
Airframe/Engine	0	3,200	6,700	6,800
Avionics	0	200	500	500
System Engineering/Program Management	0	700	1,100	700
Test	0	12,300	18,700	12,100
Support Equipment	0	300	1,300	800
Nonrecurring Missionization	0	8,800	10,200	4,900
Data	0	500	700	500
Type I Training	0	2,449	400	0
Mission Support	2,788	2,500	1,800	1,800
ECO	0	1,497	3,324	1,339
Award Fee	0	3,500	700	1,200
Curriculum Development	0	0	0	2,400
Operational Flight Trainer	0	0	0	13,500
Training Management System	0	0	1,500	20,600
Other Training Devices	0	0	100	3,500
Total	2,788	35,946	47,024	76,639

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)							DATE		February 1995	
BUDGET ACTIVITY			PE NUMBER AND TITLE				PROJECT NO.			
#5, Engineering and Manufacturing Development			0604233F, Specialized Undergraduate Pilot Training				4102			
(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)										
Performing Organizations:										
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Total Program
Product Development Organizations										
TBD										
Support and Management Organizations										
Misc	Misc	Misc	N/A	N/A	3,000	2,788	2,500	1,800	18,400	30,288
Test and Evaluation Organizations										
TBD										
Note: Breakout of FY95 and beyond funding will be determined based on contractor selected.										

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE		PROJECT NO.
#5, Engineering and Manufacturing Development	0604233F, Specialized Undergraduate Pilot Training		4102
(U) B. Budget Acquisition History and Planning Information Continued (\$ in Thousands).			
Government Furnished Property: N/A			
Subtotal Product Development	3,000	2,788	2,500
Subtotal Support and Management		1,800	18,400
Subtotal Test and Evaluation			30,288
Total Project	3,000	2,788	35,946
		47,024	76,639
			152,375
			329,475

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#5, Engineering and Manufacturing Development		0604233F, Specialized Undergraduate Pilot Training								4376	
COST (\$ in Thousands)		FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
T-38 Avionics Upgrade		0	0	16,018	23,778	10,945	0	0	0	0	50,741
<p>(U) A. <u>Mission Description and Budget Item Justification</u></p> <p>The T-38 Avionics Upgrade is planned as an integrated modernization of the T-38 and AT-38 cockpits to support mission-ready bomber/fighter training. The modern, digital cockpit will include Global Positioning System (GPS), Heads-Up Displays (HUDs), Inertial Navigation System (INS), Multi-function Displays (MFDs), and hands-On Throttle and Stick (HOTAS) switchology. HUD symbology will be the new USAF standard recently certified as a primary flight reference. The program includes the design, integration, test, and kit-proofing of the cockpit prototype aircraft, simulators, and other training devices.</p> <p>(U) <u>EY 1994</u></p> <p>- (U) Completed Cockpit Upgrade Avionics Study (PE65808F and PE64201F funded)</p> <p>(U) <u>EY 1995</u></p> <p>- (U) Develop and finalize acquisition strategy; develop System Requirements Document; develop and release Request for Proposal (RFP), receive proposals, and begin Source Selection (PE64201F funded)</p> <p>(U) <u>EY 1996</u></p> <p>- (U) Complete Source Selection process; award contract for Engineering and Manufacturing Development (EMD) with options for production, installation and support for 425 AT/T-38 aircraft; begin EMD - conduct System Requirement Review; conduct hardware Preliminary Design Review (PDR) (\$16,018K)</p> <p>(U) <u>EY 1997</u></p> <p>- (U) Continue EMD phase - conduct system/software PDR and Critical Design Review (CDR); start system integration and contractor testing and complete demonstrations (\$23,778K)</p>											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)			DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE		PROJECT NO.
#5, Engineering and Manufacturing Development		0604233F, Specialized Undergraduate Pilot Training		4376
(U) B. <u>Program Change Summary (\$ in Thousands)</u>				
Previous President's Budget	1994	1995	1996	1997
Appropriated Value	0	0	0	0
Adjustments to Appropriated Value	0	0		
a. Cong Gen Reductions				
b. SBIR				
c. Omnibus or Other Above Threshold Reprogramming				
d. Below threshold Reprogramming				
Adjustments to Budget Years Since FY95 PB		16,018		23,778
Current Budget Submit/President's Budget	0	0	16,018	23,778
(U) Change Summary Explanation:				
(U) Funding: Establishment of new project				
(U) Schedule: N/A				
(U) Technical: N/A				
(U) C. <u>Other Program Funding Summary (\$ in Thousands)</u>				
Aircraft Procurement, Air Force	1994	1995	1996	1997
0804741F Avionics Upgrade, MN-6029	0	0	0	0
			31,321	128,913
			118,244	124,063
			249,059	651,600
Related RDT&E: N/A				

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY		PE NUMBER AND TITLE												DATE		PROJECT NO.	
#5, Engineering and Manufacturing Development		0604233F, Specialized Undergraduate Pilot Training												February 1995		4376	
		1994			1995			1996			1997						
		1	2	3	4	1	2	3	4	1	2	3	4				
(U) D. <u>Schedule Profile</u>																	
Acquisition Milestones																	
Strategic Roundtable						x											
Tactical Roundtable																	
Milestone 0//II							x										
Engineering Milestones																	
Completed T-38 Avionics Upgrade Study																	
Develop Systems requirement Document									x								
Begin Engineering and Manufacturing Development (EMD)																	
Complete PDRs (H/W, S/W, System)																	
Complete CDR (H/W, S/W, System)																x	
T&E Milestones																	
Draft Test and Evaluation Master Plan (TEMP)									x								
TEMP																	
Begin Systems Integration Laboratory Demonstrations													x				
Begin Contractor System Testing																	
Contract Milestones																	
Release Request for Proposal (RFP)																	
Source Selection																	
Contract award																x	

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	PROJECT NO.
BUDGET ACTIVITY	PE NUMBER AND TITLE		
#5, Engineering and Manufacturing Development	0604233F, Specialized Undergraduate Pilot Training	February 1995	4376
(U) A. <u>Project Cost Breakdown (\$ in Thousands)</u>			
	1994	1995	1996
Prime Mission Equipment			1997
Platform Integration		584	248
- Electronic System Integration		3,617	3609
- Platform Mod Kit			6,817
- Platform Software		4,786	4,429
System Test & Evaluation			
- Developmental Test & Evaluation		211	2,465
- Mockups		1,370	903
- Test & Evaluation Support		2	174
System Engineering / Project Management			
- System Engineering (NON - ILS)		218	214
- System Engineering Program Management		1,617	1,308
Technical Data			
- Data (NON - ILS)		36	15
- Data (ILS)		1,303	1,297
Training			
- Training Equipment		1,128	1,143
Spare & Repair Parts			
- Initial Spare & Repair Parts		64	59
Other (Engineering Change Order & Other Government Costs)			
Total		1,082	1,097
		16,018	23,778

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE						PROJECT NO.			
#5, Engineering and Manufacturing Development		0604233F, Specialized Undergraduate Pilot Training						4376			
(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)											
Performing Organizations:											
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
Product Development Organizations											
TBD											
Support and Management Organizations											
TBD											
Test and Evaluation Organizations											
TBD											
Note: Breakout by performing organization not available at this time; will be estimated after Acquisition Strategy Panel.											

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	PROJECT NO.	
BUDGET ACTIVITY	PE NUMBER AND TITLE			
#5, Engineering and Manufacturing Development	0604233F, Specialized Undergraduate Pilot Training			4376
(U) B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)				
Government Furnished Property: N/A				
Subtotal Product Development				
Subtotal Support and Management				
Subtotal Test and Evaluation				
Total Project		0	0	0
		16,018	23,778	10,945
				50,741

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY										DATE
5 - Engineering & Manufacturing Development										February 1995
PE NUMBER AND TITLE										
0604239F F-22 EMD										
COST (\$ in Thousands)	FY 1994 & Prior	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost* (FY94-Comp)
Total Program Element (PE) Cost	9,566,953	2,281,135	2,138,718	1,957,067	1,355,019	997,118	781,521	404,776	0	19,482,307
<p>* FY95 and FY96 budget reductions have left insufficient funding to meet current contract requirements. Based on experience from past renegotiations, we estimate first flight will slip three months and all subsequent milestones will slip six months. The resulting cost increase to the Engineering and Manufacturing Development (EMD) program is currently being assessed and will be reflected in future program documentation.</p> <p>A. (U) <u>Mission Description and Budget Item Justification</u> (Dollars in Thousands)</p> <p>(U) The F-22 Program is developing the next-generation air superiority fighter for the USAF to counter emerging worldwide threats. The F-22 is designed to penetrate enemy airspace and achieve a first look, first kill capability against multiple targets. The F-22 is characterized by a low observable, highly maneuverable airframe, advanced integrated avionics, and aerodynamic performance that allows supersonic cruise without the use of afterburner. The F-22 is currently in the Engineering and Manufacturing Development (EMD) phase of acquisition and plans to release long lead production funding for Pre-Production Verification (PPV) aircraft in FY97. The contract is Cost Plus Award Fee with Lockheed Aeronautical Systems Company (LASC) and Pratt & Whitney (P&W) to produce the F119 engines. The engines are provided to LASC as Government Furnished Equipment (GFE).</p> <p>The EMD phase effort consists of:</p> <ul style="list-style-type: none"> - Design, fabrication, development, test and delivery of nine flight test vehicles (7 single seat and 2 dual seat) and two ground test vehicles (static and fatigue). - Design, fabrication, development, test, and delivery of 27 flight qualified engines. - Design, fabrication, development, integration, and test of the EMD avionics suite including air-to-surface provisions. - Updating the YF-22 Avionics Flying Laboratory with EMD assets and software to become a Flying Test Bed (FTB) to support avionics integration. - Design, development, and test of F-22 weapon system support and training systems. - Renovation of facilities at Edwards Air Force Base (AFB) in support of the F-22 program. <p>(U) FY 1994</p> <ul style="list-style-type: none"> - (U) Air Vehicle (\$1,144,495) <ul style="list-style-type: none"> - Initiated fabrication of EMD aircraft #1 parts. (Not Separately Priced (NSP)) - Continued subsystem design, development, and test activity. Accomplished over 80% of detailed weapon system design. (NSP) - Completed Training Systems Requirements Review Update (RRU). (NSP) - Initiated Initial Production Readiness Review (PRR) assessments. (NSP) - Design of Integrated Maintenance Information System (IMIS) completed. (NSP) - Continued design and development of Air Vehicle support system products. (NSP) - Depot Support Planning (NSP) 										

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE 0604239F F-22 EMD	
5 - Engineering & Manufacturing Development		
A. (U) <u>Mission Description and Budget Item Justification (CONT)</u> (Dollars In Thousands)		
<ul style="list-style-type: none"> - (U) Avionics (\$643,798) <ul style="list-style-type: none"> - Conducted successful mission software Preliminary Design Review (PDR). (Not Separately Priced (NSP)) - Conducted successful Radar Core, Controls & Displays (C&D), Stores Management System (SMS) Critical Design Reviews (CDR). (NSP) - Finalized Flying Test Bed (FTB) requirements. (NSP) - Continued avionics subsystem design in preparation of CDR. (NSP) - Accomplished definition of system modeling/simulation requirements (NSP) - (U) Engine (\$270,511) <ul style="list-style-type: none"> - Continued engine development test program with 3 engines. (NSP) - Continued analysis and redesign of development engine components. (NSP) - Continued design and development of engine support system products. (NSP) 		
(U) <u>FY 1995</u>		
<ul style="list-style-type: none"> - (U) Air Vehicle (\$1,381,763) <ul style="list-style-type: none"> - Finalize FTB test configuration. (NSP) - Complete Air Vehicle CDR/Initial Production Readiness Review (PRR). (NSP) - Continue to design/fabricate support system equipment for test. (NSP) - Continue technical order development. (NSP) - Initiate assembly of Engineering and Manufacturing Development (EMD) aircraft #1. (NSP) - Fabricate major sub-assembly items for EMD aircraft #2 and Static Test aircraft. (NSP) - Continue Detailed Design. (NSP) - Continue design and development of Air Vehicle support system products (NSP) - Depot support planning. (NSP) - Fabricate & deliver Support Equipment (SE) in support of final aircraft assembly. (NSP) - (U) Avionics (\$636,319) <ul style="list-style-type: none"> - Continue development of initial Block 0 software release. (NSP) - Conduct Avionics, subsystem CDR's. (NSP) - Conduct mission software Block 1 CDR, initiate Block 2 design. (NSP) - Initiate FTB design and structural modification design. (NSP) - Controls & Displays (C&D), Stores Management System (SMS) first article delivery. (NSP) 		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

5 - Engineering & Manufacturing Development

0604239F F-22 EMD

A. (U) Mission Description and Budget Item Justification (CON'T)
(Dollars in Thousands)

- (U) Engine (\$292,638)
- Continue engine development test program-add (2) test engines (5 Total). (Not Separately Priced (NSP))
- Initiate long lead for initial flight test engines. (NSP)
- Continued engine support system product development/fabrication for flight test. (NSP)

(U) FY 1996

- (U) Air Vehicle (\$1,358,175)
 - Complete assembly of Engineering and Manufacturing Development (EMD) aircraft #1 and #2 (NSP)
 - Software Block 0 release. (NSP)
 - Initiate assembly of static test article, and EMD aircraft #3. (NSP)
 - Initiate modification of Flying Test Bed (FTB). (NSP)
 - Initiate fabrication of fatigue article. (NSP)
 - Fabricate Support System elements for F-22 first flight. (NSP)
 - Conduct Two-Seat Air Vehicle Preliminary Design Review (PDR). (NSP)
 - Complete Two-Seat Air Vehicle Critical Design Review (CDR). (NSP)
 - Complete Training System Requirements Description Review Update. (NSP)
 - Continued design and development of Air Vehicle support system product (NSP)
 - Depot support planning (NSP)
 - Complete fabrication & delivery of Support Equipment in support of final assembly. (NSP)
 - Fabricate & deliver Support Equipment to support flight test. (NSP)
 - Complete initial depot activation planning. (NSP)
- (U) Avionics (\$502,339)
 - Conduct mission software Block 2 PDR, Block 2 CDR. (NSP)
 - Complete mission software Block 1 coding, Computer Software Component (CSC) test. (NSP)
 - Inertial Reference System (IRS), Common Integrated Processor (CIP) first article delivery. (NSP)
 - Initiate mission software Block 3 design. (NSP)
 - Continue FTB modification and initial avionics installation. (NSP)
- (U) Engine (\$278,204)
 - Continued engine development test program and initial flight clearance qualification. (NSP)
 - Build and test initial flight test engines. (NSP)
 - Deliver and validate engine support system products. (NSP)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE
BUDGET ACTIVITY		February 1995
5 - Engineering & Manufacturing Development	PE NUMBER AND TITLE 0604239F F-22 EMD	
<p>A. (U) <u>Mission Description and Budget Item Justification (CONT)</u> (Dollars in Thousands)</p> <p>(U) FY 1997</p> <ul style="list-style-type: none"> - (U) Air Vehicle (\$1,337,587) <ul style="list-style-type: none"> - Conduct Interim Production Readiness Review (PRR). (Not Separately Priced (NSP)) - Conduct F-22 first flight. (NSP) - Continue modification of Flying Test Bed (FTB). (NSP) - Fabricate fatigue test article. (NSP) - Initiate test of static article. (NSP) - Initiate fabrication of Engineering & Manufacturing Development (EMD) aircraft #4, #5, #6, and #7. (NSP) - Complete Requirements Review for Initial Operations and Depot. (NSP) - Design, development, and verification of Air Vehicle support system products (NSP) - Depot Support Planning (NSP) - Conduct First Flight Readiness Review (FRR). (NSP) - Tech order data for 1st Developmental Test & Evaluation (DT&E) aircraft available. (NSP) - Integrated Maintenance Information System (IMIS) for flight test available. (NSP) - Initial Operations/Depot Requirements Review. (NSP) - Supply Support Provisioning Management System implemented. (NSP) - Complete initial supportability assessment. (NSP) - (U) Avionics (\$423,786) <ul style="list-style-type: none"> - Continue Avionics Integration Laboratory (AIL) integration in preparation of Block 1 integration testing. (NSP) - Complete FTB modifications, conduct air worthiness review. (NSP) - Complete mission software Block 2 coding and integration test. (NSP) - Conduct mission software Block 3 Preliminary Design Review (PDR) and Critical Design Review (CDR). (NSP) - Communication, Navigation, and Identification (CNI) first article delivery. (NSP) - Complete mission software Block 1 Integration. (NSP) - Complete mission software Block 2 coding and Computer Software Unit (CSU) test. (NSP) - (U) Engine (\$195,694) <ul style="list-style-type: none"> - Initiate production engine qualification testing. (NSP) - Deliver and support flight test engines. (NSP) - Begin verification of engine support system products. (NSP) 		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY		PE NUMBER AND TITLE		DATE
5 - Engineering & Manufacturing Development		0604239F F-22 EMD		February 1995
B. (U) Program Change Summary (\$ in Thousands)				
Previous President's Budget (FY95 PB)	1994 2,082,904	1995 2,461,149	1996 2,318,520	1997 1,582,961
Appropriated Value	2,082,904	2,351,049		Total Cost (FY94 - Compl) 18,879,400
Adjustments to Appropriated Value				
a. Undistributed General Reductions	-24,100	-25,757		
b. Below Threshold Reprogrammings		-44,157		
c. Small Business Innovative Research (SBIR)				
d. Adjustments to Budget Years Since FY95 PB				
Current Budget Submit/President's Budget	2,058,804	2,281,135	-179,802 2,138,718	.374,106 1,957,067
Change Summary Explanation:				
FY96 PB Funding Changes:				
- FY94/95 Budget Cut Restoral				
- SBIR Restoral				
- HAZMAT Policy Compliance				
- MILCON Schedule Adjustment				
- Congressional cut of \$110M in FY95				
- OSD cut of \$200M in FY96				
- Adjustment of Inflation Indices				
FY96 PB Schedule Changes:				
- 3 month slip in Critical Design Review (CDR)/8 month slip in first flight as a result of FY94 and FY95 funding reductions.				
- Production slip of one year also resulting from FY94/FY95 Funding reductions				
- FY95 and FY96 budget reductions have left insufficient funding to meet current contract requirements. Negotiations with the development contractors to reschedule FY95 and FY96 efforts have been initiated. Initial estimates of the schedule impacts are 3 month slip in first flight, 6 month delay to production and Initial Operational Capability (IOC).				
FY96 PB Technical Changes:				
- JTIDS-Receive Only, AIM-9X, and Helmet Mounted Cueing System integration capability were added to the baseline aircraft as POM Initiatives				

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BUDGET ACTIVITY										DATE										February 1995	
5 - Engineering & Manufacturing Development										PE NUMBER AND TITLE											
0604239F F-22 EMD																					
C. (U) Other Program Funding Summary (\$ in Thousands)																					
	PY	1995	1996	1997	1998	1999	2000	2001	To	Total											
									Compl*	Cost*											
Military Construction (PE 0604239F)	0	4,550	12,100	4,400	0	0	0	0	0	21,050											
Military Construction (PE 0207219F)	0	0	0	0	5,500	4,400	20,423	25,250	108,600	164,173											
Aircraft Procurement (PE 0207219F)	0	0	0	91,368	996,729	1,221,947	2,253,458	3,554,469	45,868,029	53,986,000											
D. (U) Schedule Profile*																					
FY Quarter		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Aircraft Delivered (EMD Test Articles)																					
Program Milestones																					
- DAB: PPV Full release; LRIP LL, 1QFY98																					
- DAB Review MS III, 2QFY2002																					
Engineering Milestones																					
- Air Vehicle CDR, 2QFY95																					
- 2 Seat Air Vehicle CDR, 4QFY96																					
- First Flight, 2QFY97																					
- First Avionics Flight, 4QFY98																					
T&E Milestones																					
- DT&E First Flight, 2QFY97																					
- Dedicated IOT&E, 2QFY01																					
EMD = Engineering & Manufacturing Development, DAB = Defense Acquisition Board, PPV = Pre-Production Verification (Aircraft), LRIP = Low Rate Initial Production, LL = Long Lead, MS = Milestone, CDR = Critical Design Review, DT&E = Developmental Test & Evaluation, IOT&E = Initial Operational Test & Evaluation																					

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

ENGINEERING & MANUFACTURING DEVELOPMENT

0604239F F-22 EMD

4069

A. (U) Project Cost Breakdown (\$ in Thousands)

	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>
Air Vehicle/Avionics	1,739,977	1,942,063	1,803,599	1,688,465
Engine	263,291	285,700	269,700	184,800
Government Cost				
- Government Test	36,037	27,336	48,075	61,916
- Mission Support	13,600	16,600	14,664	15,108
- GFE	5,899	9,436	2,680	6,778
Total	2,058,804	2,281,135	2,138,718	1,957,067

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1995	PROJECT NO.
BUDGET ACTIVITY					PE NUMBER AND TITLE							
5 - Engineering & Manufacturing Development					0604239F F-22 EMD					4069		
B. (U) Budget Acquisition History and Planning Information (\$ in Thousands)												
Performing Organizations:												
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC**	Project Office EAC**	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete*	Total Program*	
<u>Product Development Organizations</u>												
Lockheed (Air Veh)	C/CPAF	Aug 91	11,169,100	12,778,200	2,896,700	1,739,977	1,942,063	1,803,599	1,688,465	2,770,115	12,840,919	
Pratt & Whitney	C/CPAF	Aug 91	1,904,800	2,134,100	743,309	263,291	285,700	269,700	184,800	197,245	1,944,045	
<u>Support and Management Organizations</u>												
Support Contracts	Various	Various			3,116	1,997	2,368	2,375	2,390	6,772	19,018	
In House Support	Various	Various			18,884	11,603	14,232	12,289	12,718	65,112	134,838	
<u>Test and Evaluation Organizations</u>												
AEDC	PO				53,972	22,952	17,174	21,861	19,115	20,158	155,232	
AFMTC	PO				5,681	6,000	9,550	13,777	33,995	445,354	514,357	
All other test	Various	Various			4,310	7,085	612	12,437	8,806	520	33,770	
<u>Test and Evaluation Property</u>												
none												
<u>Government Furnished Equipment</u>												
GFE	Various	Various			2,366	5,899	9,436	2,680	6,778	33,158	60,317	
Total					3,728,338	2,058,804	2,281,135	2,138,718	1,957,067	3,538,434	15,702,496	
* Does not include impacts of rephrase due to FY95 & FY96 cuts.												
** Reflects December 31, 1994 SAR Estimated Price at Completion												

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	
BUDGET ACTIVITY											
#5-Engineering & Manufacturing Development											
PE NUMBER AND TITLE											
0604240F B-2 ADVANCED TECHNOLOGY BOMBER											
	COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
	Total Program Element (PE) Cost										
64240F		776,323	376,690	623,616	446,225	425,578	160,787	165,573	170,494	0	24,808,012
<p>A. Mission Description and Budget Item Justification</p> <p>(U) The B-2 is an all-wing, two-crew aircraft with provisions for a third crew member and has twin weapons bays of over 20,000 pounds capacity each. It is powered by four F118-GE-100 turbofan engines. The low wing loading provides efficient cruise and good airfield performance. The B-2 bomber exploits breakthroughs in low observables technology (radar, infrared, visual, electromagnetic, and acoustic) to achieve vehicle signatures that will allow penetration of current and postulated enemy air defenses. The B-2 will have the capability to perform worldwide conventional and nuclear delivery missions consistent with Air Combat Command requirements. Survivability will be enhanced by reduction of observable signatures and a complementary defensive management system. The B-2 will also have a low altitude terrain following capability and a penetration speed commensurate with high probability of survival without unduly penalizing mission range. The research category for the program is engineering and manufacturing development. The management and acquisition strategy provides the user a capability for the lowest possible cost.</p>											
(U)	<u>FY 1994</u>	Continued developmental test and evaluation. (\$190,391) Continued development and support acquisition. (\$75,861) Continued primary hardware development. (\$510,071)									
(U)	<u>FY 1995</u>	Continued developmental test and evaluation. (\$168,376) Continued development and support acquisition. (\$71,580) Continued primary hardware development. (\$136,734)									
(U)	<u>FY 1996</u>	Continue developmental test and evaluation. (\$153,530) Continue development and support acquisition. (\$100,299) Continue primary hardware development. (\$369,787)									

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE																																																												
BUDGET ACTIVITY	PE NUMBER AND TITLE																																																													
#5-Engineering & Manufacturing Development	0604240F B-2 ADVANCED TECHNOLOGY BOMBER	FEB 1995																																																												
<p>A. <u>Mission Description and Budget Item Justification</u> (continued)</p> <p>(U) FY 1997</p> <ul style="list-style-type: none"> - (U) Continue developmental test and evaluation. (\$126,421) - (U) Continue development and support acquisition. (\$85,027) - (U) Continue primary hardware development. (\$234,777) 																																																														
<p>B. <u>Program Change Summary</u> (\$ in Thousands)</p> <table border="1"> <thead> <tr> <th></th> <th>1994</th> <th>1995</th> <th>1996</th> <th>1997</th> <th>Total Cost</th> </tr> </thead> <tbody> <tr> <td>Previous President's Budget</td> <td>785,820</td> <td>408,500</td> <td>511,835</td> <td>448,810</td> <td>24,658,000</td> </tr> <tr> <td>Appropriated Value</td> <td>790,497</td> <td>388,543</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Adjustments to Appropriated Value</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>a. Congressional General Reductions</td> <td>(4,677)</td> <td>(4,463)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>b. SBIR</td> <td>(9,035)</td> <td>(7,294)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>c. Omnibus Reprogramming</td> <td></td> <td>(96)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>d. Below Threshold Reprogramming</td> <td>(462)</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Adjustment to Budget Years Since FY95 PB</td> <td></td> <td></td> <td>111,781</td> <td>(2,585)</td> <td>123,180</td> </tr> <tr> <td>Current Budget Submit/President's Budget</td> <td>776,323</td> <td>376,690</td> <td>623,616</td> <td>446,225</td> <td>24,808,012</td> </tr> </tbody> </table> <p>Change Summary Explanation:</p> <p>Funding: A requirements review has substantiated a \$111.8M budget transfer in FY 96 between Production and RDT&E. This request is for subcontractor software sustaining and Automatic Test Equipment / Test Program Set (ATE/TPS) integration requirements. It also accounts for additional Terrain Following system integration efforts, data recorder modifications, and additional lab LRU's to support completion of development efforts and inflation adjustments.</p> <p>Schedule: N/A</p> <p>Technical: N/A</p>				1994	1995	1996	1997	Total Cost	Previous President's Budget	785,820	408,500	511,835	448,810	24,658,000	Appropriated Value	790,497	388,543				Adjustments to Appropriated Value						a. Congressional General Reductions	(4,677)	(4,463)				b. SBIR	(9,035)	(7,294)				c. Omnibus Reprogramming		(96)				d. Below Threshold Reprogramming	(462)					Adjustment to Budget Years Since FY95 PB			111,781	(2,585)	123,180	Current Budget Submit/President's Budget	776,323	376,690	623,616	446,225	24,808,012
	1994	1995	1996	1997	Total Cost																																																									
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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE

FEB 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

#5-Engineering & Manufacturing Development

0604240F B-2 ADVANCED TECHNOLOGY BOMBER

C. Other Program Funding Summary (\$ in Thousands)

	1994/P	1995	1996	1997	1998	1999	2000	2001	To Compl	Total Cost
(U) Aircraft Procurement, Air Force, Combat Aircraft / BA01 / B-2A / PE 11127F	16,280,833	337,001	279,921	216,900	223,481	180,550	240,330	36,153	271,216	18,066,385
(U) Aircraft Procurement, Air Force, Modifications / BA05 / B-2A / PE 11127F	23,590	63,982	17,286	5,640	6,139	4,559	7,683	7,684	0	136,563
(U) Aircraft Procurement, Air Force, Common Support Equipment / BA07 / Items Less than \$2,000,000 / PE 11127F	9,710	3,938	538	471	497	497	497	497	0	16,645
(U) Aircraft Procurement, Air Force, Aircraft Support Equipment and Facilities / BA07 / Industrial Preparedness / PE 78011F	0	8,500	15,700	5,400	5,400	5,600	5,700	0	0	46,300
(U) Aircraft Procurement, Air Force, Aircraft Support Equipment and Facilities / BA07 / Bomber Industrial Base Support / PE 78011F	0	125,000	0	0	0	0	0	0	0	125,000
(U) Aircraft Procurement, Air Force, Aircraft Replenishment Spares / BA06 / B-2A / PE 11127F	576	1,833	5,792	7,722	8,247	8,607	8,851	9,102	0	50,730
(U) Aircraft Procurement, Air Force, Aircraft Initial Spares / BA06 / B-2A / PE 11127F	869,970	2,351	59,300	122,406	184,045	83,344	7,404	3,547	0	1,332,367
(U) Missile Procurement, Air Force, Other Missiles / BA42 / GPS Aided Munition / PE 28030F	0	24,830	0	0	0	0	0	0	0	24,830
(U) Procurement (Other), Air Force / BA 02, 03, 04 / B-2A / PE 11127F	147,690	459	65,585	20,701	17,448	11,312	12,295	12,661	0	288,144
(U) MILCON / BA01 / PE 11127F	478,900	23,000	24,600	5,400	24,200	0	0	0	0	566,100

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-2)									
DATE									
PROJECT NO.									
BUDGET ACTIVITY									
PE NUMBER AND TITLE									
0604240F B-2 ADVANCED TECHNOLOGY BOMBER									
#5-Engineering & Manufacturing Development									
D. Schedule Profile									
FY 1994									
1 2 3 4 1 2 3 4 1 2 3 4									
1995									
1996									
1997									
(U) Block 10	X*								
(U) First Article Delivery	X*								
(U) Complete Climatic Lab Testing									
(U) Complete Envelope Expansion									
(U) Complete GPS Testing									
(U) Block 20									
(U) Complete Arctic & Tropic Testing									
(U) Complete GATS Testing									
(U) Block 30									

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE _____

FEB 1995

BUDGET ACTIVITY

TYPE NUMBER AND TITLE

PROJECT NO.

#5-Engineering & Manufacturing Development

0604240F B-2 ADVANCED TECHNOLOGY BOMBER

A. <u>Project Cost Breakdown (\$ in Thousands)</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>
Equipment Development & Evaluation	650,523	271,838	493,919	330,255
Government Test	89,857	60,810	64,510	65,710
Other Government Costs (OGC)	11,463	18,471	13,413	13,374
Other - Direct Release	24,480	25,571	51,774	36,886
Total	776,323	376,690	623,616	446,225

B. Budget Acquisition History and Planning Information (\$ in Thousands)

Performing Organizations

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC**	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
<u>Product Development Organizations</u>											
Air Vehicle - NG	CPIF/AF	Nov 81	20,946,000	21,335,925	18,968,577	595,000	227,454	450,844	290,886	803,164	21,335,925
Aircrew Training - Link	CPIF	Jul 85	560,704	562,879	546,079	12,800	4,000				562,879
Mission Planning	N/A*	N/A	324,314	324,314	166,889	27,119	23,538	35,114	34,769	36,885	324,314
<u>Support and Management Organizations</u>											
Other Govt Costs (OGC)	N/A	N/A	N/A	624,521	545,264	11,463	18,471	13,413	13,374	22,536	624,521
Direct Release	N/A	N/A	N/A	414,816	232,900	24,480	25,571	51,774	36,886	43,205	414,816
<u>Test and Evaluation Organizations</u>											
Govt Test	N/A	N/A	N/A	853,437	555,908	89,857	60,810	64,510	65,710	16,642	853,437

★ Multiple Contracts

**** Includes known requirements not yet on contract**

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	FEB 1995	PROJECT NO.
BUDGET ACTIVITY		PE NUMBER AND TITLE										
#5-Engineering & Manufacturing Development		0604240F B-2 ADVANCED TECHNOLOGY BOMBER										
B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)												
Government Furnished Property												
Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program		
Product Development Property												
Engines - G.E.	N/A*	N/A	N/A	539,613	10,442	7,900	6,800	4,600	0	569,355		
AARL - Boeing (Wichita)	FPIF	Jun 88	N/A	107,568	5,162	8,946	1,161	0	0	122,837		
* Multiple Contracts												
Support and Management Property												
N/A												
Test and Evaluation Property												
N/A												
Subtotal Product Development												
				20,328,726	650,523	271,838	493,919	330,255	840,049	22,915,310		
				778,164	35,943	44,042	65,187	50,260	65,741	1,039,337		
				555,908	89,857	60,810	64,510	65,710	16,642	853,437		
Subtotal Support and Management												
Subtotal Test and Evaluation												
Total Project												
				21,662,798	776,323	376,690	623,616	446,225	922,432	24,808,012		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY										DATE	
#5, Engineering and Manufacturing Development (EMD)										FEBRUARY 1995	
PE NUMBER AND TITLE											
#0604243F Manpower, Personnel, and Training Development											
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Total Program Element (PE) Cost	4,756	4,466	5,300	5,174	5,365	4,471	4,604	4,742	Cont	TBD	
3818 Maintenance Skills Tutor (MST)	4,607	4,466	4,270	4,168	4,311	4,471	4,604	4,742	Cont	TBD	
4369 Air Education and Training Management System (AETMS) *	0	0	1,030	1,006	1,054	0	0	0	0	3,090	
3817 Base Training System (BTS)	149	0	0	0	0	0	0	0	Program Complete	3,116	

(U) A. Mission Description and Budget Item Justification This program is in the research category/budget activity EMD as it provides engineering development of manpower, personnel and training (MPT) technologies to improve effectiveness of Air Force training/delivery, performance, assessment, personnel acquisition, job assignment, force management, and human performance in weapon systems. MSTs are designed to leverage senior maintenance personnel experience, through the use of artificial intelligence, for use in training junior specialists. AETMS will be the major Air Education and Training Command (AETC) training system with emphasis on centralized training focus for a decentralized training environment. AETC will benefit from more standardized training command wide. Acquisition strategies are covered under individual projects.

(U) B. Program Change Summary (\$ in Thousands)

Previous President's Budget	1994	1995	1996	1997	Total Cost
Appropriated Value	4,811	4,636	4,293	4,190	TBD
Adjustments to Appropriated Value					
a. General Undistributed reductions ;	-55	-84			
b. SBIR		-86			
Adjustments to budget years since FY95 PB			+1,007	+984	
Current Budget Submit/President's Budget	4,756	4,466	5,300	5,174	TBD

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	FEBRUARY 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#5, Engineering and Manufacturing Development (EMD)	#0604243F Manpower, Personnel, and Training	3818	
<p>(U) B. <u>Program Change Summary Continued (\$ in Thousands)</u></p> <p>Change Summary Explanation:</p> <p>Funding: AETMS was generated in the transfer of the Advanced Training System from PE 0604227F, in FY96. BPAC reflects non-pay purchases inflation; FY94 \$55 actuals reduction; FY95 reduction for FFRDC, NON-FFRDC, university research, and travel</p> <p>Technical: Not Applicable</p> <p>Schedule: Not Applicable.</p> <p>(U) C. <u>Other Program Funding Summary (\$ in Thousands)</u> Not Applicable</p> <p>(U) D. <u>Schedule Profile</u> See individual projects</p>			

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY		PE NUMBER AND TITLE							DATE	PROJECT NO.
#5, Engineering and Manufacturing Development (EMD)		#0604243F Maintenance Skills Tutors (MST)							FEBRUARY 1995	3818
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
3818, Maintenance Skills Tutors (MST)	4,607	4,466	4,270	4,168	4,311	4,471	4,604	4,742	Cont	TBD
<p>(U) A. <u>Mission Description and Budget Item Justification</u></p> <p>MST will field multiple computer-based tutors for the Combat Air Forces and other Air Force agencies to improve training of complex skills for a broad range of Air Force jobs; primarily aircraft maintenance troubleshooting. These MST's may include some initial skills training, but primary emphasis will be on the more difficult cognitive skills such as understanding and trouble shooting problems that the maintenance aiding equipment and systems are unable to diagnose. Four of the initial Air Combat Command (ACC) tutors will be fieldable test/research assets developed by Armstrong Lab under the Basic Job Skills (BJS) program. The System Program Office (SPO) is developing two tutors as a pre-EMD cost and schedule risk reduction effort. This effort was approved by the Designated Acquisition Commander (DAC), HSC/CC, with support from our user, ACC/LG. The core tutor software models from this effort will be reused for the remaining five tutors. The last five tutors will be developed under EMD.</p> <p>(U) EY1994 (\$ in Thousands)</p> <p>(U) - Continued development of F-16 Avionics A and C shop tutors. (\$2,410)</p> <p>(U) - Modified and fielded F-15 avionics intermediate shop tutor. (\$1,100)</p> <p>(U) - Evaluated alternative tutor capabilities. (\$1,097)</p> <p>(U) EY 1995 (\$ in Thousands)</p> <p>(U) - Complete development, begin operational evaluation and fielding of the F-16 flightline Avionics A and C shop tutors. (\$1,416)</p> <p>(U) - Begin cognitive task analysis for the F-16 flightline Avionics B shop tutors. (\$1,920)</p> <p>(U) - Begin operational evaluation and fielding of two F-15 flightline avionics tutors and two F-15 flightline pneumatics tutors. (\$400)</p> <p>(U) - Begin evaluation of tutors authorizing package options (\$ 730)</p>										

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	FEBRUARY 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#5, Engineering and Manufacturing Development (EMD)	#0604243F Maintenance Skills Tutors (MST)	3818	
(U) <u>FY 1996</u> (\$ in Thousands)			
(U) - Complete operational evaluation and upgrade of F-15 and F-16 avionics tutors. (\$400)			
(U) - Complete development and begin operational evaluation and fielding of F-16 flightline Avionics B shop tutors. (\$890)			
(U) - Begin development of F-16 Tactical Aircraft Maintenance Specialist (TAMS) I tutor, collect Cognitive Task Analysis (CTA) data and begin S/W design. (\$2,400)			
(U) - Begin evaluation and modification of Rapid Intelligent Tutor Development System (RIDES) and continue other tutor authoring software. (\$580)			
(U) <u>FY 1997</u> (\$ in Thousands)			
(U) - Complete development and begin operational evaluation and fielding of the F-16 TAMS 1 tutor. (\$1,600)			
(U) - Begin development of F-16 TAMS 2 tutor. (\$2,368)			
(U) - Complete operational evaluation and fielding of F-16 flightline Avionics B shop tutor. (\$200)			
(U) B. <u>Program Change Summary (\$ in Thousands)</u>			
Previous President's Budget		<u>1994</u>	<u>1995</u>
Appropriated Value		4,662	4,636
Adjustments to Appropriated Value		4,662	4,636
a. General Universal reductions		-55	-84
b. SBIR			-86
Adjustments to budget years since FY95 PB			-23
Current Budget Submit/President's Budget		4,607	4,466
Change Summary Explanation:			-22
Funding: FY95 reduction for FFRDC, NON FFRDC, university research, and travel. FY96-97 reflect non-pay purchases inflation.			4,168
Technical: Not Applicable			
Schedule: Not Applicable			
		<u>Total</u>	<u>Cost</u>
			TBD

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	PROJECT NO.	
BUDGET ACTIVITY	PE NUMBER AND TITLE			
#5, Engineering and Manufacturing Development (EMD)	#0604243F Maintenance Skills Tutors (MST)			3818
(U) A. <u>Project Cost Breakdown (\$ in Thousands)</u>				
		1994	1995	1996
Software Development		2,190	1,667	2,002
Interim Contractor Support (ICS) software				
Maintenance		366	252	358
Contractor Eng. Support Total		589	928	685
Cognitive Task Analysis Support		508	866	464
Govt Logistics Mgt Support		300	310	275
Govt Audio/Visual Support		51	52	52
Travel		100	125	102
Misc.		503	266	284
TOTAL		4,607	4,466	4,270
				1997
				2,198
				81
				527
				473
				275
				52
				102
				460
				4,168

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE

FEBRUARY 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

#5, Engineering and Manufacturing Development (EMD)

#0604243F Maintenance Skills Tutors (MST)

3818

(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)

Performing Organizations:

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
<u>Product Development Organizations</u>											
Bolt, Beranek, & Newman (BBN)	SS/CPFF & CPAF	Feb 94	2,500	2,650	0	1,840	732	105	0	0	2,677
UNIV. Pittsburgh	SS/CP	Feb 93	1,537	1,537	957	350	150	117	0	0	1,574
Galaxy Scientific	SS/CPFF	Jan 94	350	1,036	0	350	686	0	0	0	1,036
EMD Contractor	C/CPFF	Nov 95	N/A	3,984	0	0	0	1,250	729	1,630	3,609
TBD	CPAF										
EMD Second Source TBD	C/CPFF CPAF	Oct 96	N/A	7,101	0	0	0	576	1,112	5,413	7,101

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Exhibit R-3

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	FEBRUARY 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#5, Engineering and Manufacturing Development (EMD)		#0604243F Maintenance Skills Tutors (MST)								3818	
Support and Management Organizations											
SPO, SA-ALC	N/A	N/A	N/A	1,743	1,559	2,038	1,758	1,855	TBD	TBD	TBD
ACC, AETC											
SETA											
Test and Evaluation Organizations Not Applicable											
(U) B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)											
Government Furnished Property:											
Contract											
Item Description	Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program	
Product Development Property											
CTA Data provided by the SPO to the software development contractors. The data describes the systems/subsystems/components and the faults problems to be simulated. CTA data collection and analysis is performed by the SPO SETA contractor (Operational Technologies Corp. (OPTECH))											
Support and Management Property Not Applicable	C/CPFF	Feb 94	Cont	0	508	860	464	473	900	3,205	
Test and Evaluation Property Not Applicable											
Subtotal Product Development											
Subtotal Support and Management											
Total Project											
				957	3,048	2,428	2,512	2,314	7,943	19,202	
				1,743	1,559	2,038	1,758	1,854	TBD	TBD	
				2,700	4,607	4,466	4,270	4,168	TBD	TBD	

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE										FEBRUARY 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#5, Engineering and Manufacturing Development (EMD)		#0604243F Air Education Training Management System 4369									
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
4369, Air Education and Training Management System (AETMS)	0	0	1,030	1,006	1,054	0	0	0	0	3,090	
<p>(U) A. <u>Mission Description and Budget Item Justification</u></p> <p>AETMS expands the Advanced Training System (ATS) to support Technical Training and Professional Education at all AETC training activities, providing a single command wide training development, delivery, and management system. Commercial hardware and software will yield a reliable and easily maintainable system. AETMS will build upon the existing ATS and other commercial/newly developed software, simplifying development. This project was generated in the transfer of the ATS project from PE 64227F, Training Systems Development, beginning in FY96. Acquisition strategy for AETMS contractor development activities will be awarded through full and open competition.</p> <p>(U) <u>FY 1994</u> Not Applicable</p> <p>(U) <u>FY 1995</u> Not Applicable</p> <p>(U) <u>FY 1996</u> (\$ in Thousands -- Project transferred from ATS project in PE 64227F)</p> <p>(U) - Complete software redevelopment of portions of ATS for tech training. (\$230)</p> <p>(U) - Initiate software development to incorporate Professional Education functionality. (\$800)</p> <p>(U) <u>FY 1997</u> (\$ in Thousands)</p> <p>(U) - Complete software development to incorporate professional education functionality. (\$300)</p> <p>(U) - Install prototype ATS at professional education site. (\$300)</p> <p>(U) - Initiate migration of proven ATS functionality to Client/Server architecture. (\$406)</p>											

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	PROJECT NO.	
BUDGET ACTIVITY	PE NUMBER AND TITLE			
#5, Engineering and Manufacturing Development (EMD)		#0604243F Air Education Training Management System 4369		
(U) B. <u>Program Change Summary (\$ in Thousands)</u>				
Previous President's Budget	1994	1995	1996	1997
Appropriated Value	0	0	0	0
Adjustments to Appropriated Value	0	0		
a. General Undistributed reduction				
Current Budget Submit/President's Budget	None	None	1,030	1,006
				3,090
Change Summary Explanation: AETMS was generated in the transfer of the ATS project beginning in FY96 from PE 64227F (FY96 \$1,035; FY97 \$1,011)				
Funding: BPAC reflects non-pay purchases inflation reduction to transferred funding				
Schedule: Not Applicable				
Technical: Not Applicable				
(U) C. <u>Other Program Funding Summary (\$ in Thousands)</u> Not Applicable				
(U) D. <u>Schedule Profile</u>				
	1994	1995	1996	1997
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Redevelopment for tech training				
Development for Professional Education			X**	X**
AETMS prototype			X*	X*
Migration to Client/Server architecture ;				X*

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	FEBRUARY 1995
BUDGET ACTIVITY		PROJECT NO.	
#5, Engineering and Manufacturing Development (EMD)		#0604243F Air Education Training Management System 4369	
(U) A. Project Cost Breakdown (\$ in Thousands)			
		1994	1995
Software Development		0	0
Teams		0	0
Travel		0	0
Training Development		0	0
Contract Administration		0	0
AETMS prototype		0	0
Total		0	0
		1996	1997
		730	413
		145	141
		72	71
		10	10
		73	71
		0	300
		1,030	1,006

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE		FEBRUARY 1995	
BUDGET ACTIVITY				PE NUMBER AND TITLE						PROJECT NO.			
#5, Engineering and Manufacturing Development (EMD)				#0604243F Air Education Training Management System 4369									
(U) B. <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u>													
Performing Organizations:													
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program		
<u>Product Development Organizations</u>													
Loral FSC	C/FFP/IF/AFT	May 89	35,025	40,958	29,650*	1,898*	1,438*	875	854	TBD	TBD		
<u>Support and Management Organizations</u>													
HSC/YARA					0	0	0	155	152	TBD	TBD		
<u>Test and Evaluation Organizations</u> Not Applicable													
* Actual funding for these years came from PE 64227 Training Systems Development, ATS Project.													
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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE		FEBRUARY 1995	
BUDGET ACTIVITY			PE NUMBER AND TITLE					PROJECT NO.					
#5, Engineering and Manufacturing Development (EMD)			#0604243F Air Education Training Management System 4369										
(U) B. <u>Budget Acquisition History and Planning Information Continued (\$ in Thousands)</u>													
Government Furnished Property:													
Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program			
Product Development Property													
DT III/IV HW & SW PR	various	various	various	482*	0	N/A	N/A	N/A	N/A	482			
Support and Management Property Not Applicable													
Test and Evaluation Property Not Applicable													
Subtotal Product Development				30,132*	1,898*	1,438*	875	854	TBD	TBD			
Subtotal Support and Management				0	0	0	155	152	TBD	TBD			
Total Project				30,132*	N/A	N/A	1,030	1,006	TBD	TBD			
* Actual funding for these years came from PE 64227 Training Systems Development, ATS Project.													
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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.			
#5 - Engineering and Manufacturing Development		PE: #0604249F/ Night/Precision Attack								2693			
COST (\$ in Thousands)		FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost		
Total Program Element (PE) Cost		1,490	21,029	8,708	4,803	1,990	1,194	1,293	1,194	Continuing	TBD		
Proj 2693 LANTIRN		1,490	21,029	8,708	4,803	1,990	1,194	1,293	1,194	Continuing	TBD		

A. (U) Mission Description and Budget Item Justification The need for Low Altitude Navigation and Targeting Infra-Red for Night (LANTIRN) is documented in Tactical Air Forces' Statement of Operational Need 302-81, Night Attack Capabilities. LANTIRN responds to that need by providing the capability to conduct close air support and interdiction missions at night and under-the-weather for F-15E and F-16C/D fighter aircraft. LANTIRN provides the capability not only to attack at night, but also to attack with precision laser guided weapons at altitudes of up to 40,000 ft. day or night and in conditions of limited visibility. The LANTIRN program includes development and testing of a wide angle raster head-up display, a navigation pod, and a targeting pod. The navigation pod contains a terrain following radar and a fixed Forward-Looking Infra-Red (FLIR) sensor; the targeting pod contains a gimbaled FLIR, a laser designator, an automatic tracker, a missile boresight correlator, and growth provisions for an automatic target recognizer. This Program Element is devoted to Engineering and Manufacturing Development (EMD) of LANTIRN and other Night-Attack related aircraft equipment.

(U) FY 1994 Program:

- (U) Risk reduction efforts for development of Laser Spot Tracker (LST) to support Close Air Support program. (\$1,300)
- (U) Program office mission support requirements. (\$190)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#5 - Engineering and Manufacturing Development	PE: #0604249F Night/Precision Attack	2693	
<p>A. (U) <u>Mission Description and Budget Item Justification (Cont.)</u></p> <p>(U) <u>FY 1995 Program:</u></p> <ul style="list-style-type: none"> - (U) Continue risk reduction efforts for development of Laser Spot Tracker (LST) to support Close Air Support (CAS) program. (\$1,400) - (U) Initiate development of targeting pod Laser Spot Tracker (LST) capability for incorporation into the F-16 Block 40 production aircraft, in support of the (CAS) mission and modification of Laser to increase operating envelope to 40,000 ft. (\$17,136) - (U) Flight test 1996 OFP software changes resulting from changes in the F-16 and F-15E software suites. (\$1,993) - (U) Program office mission support requirements. (\$500) <p>(U) <u>FY 1996 Planned Program</u></p> <ul style="list-style-type: none"> - (U) Continue development of targeting pod LST and 40,000 ft. laser capability. (\$5,908) - (U) Develop software updates for LST program, including OFP and Support Equipment test software. (NSP) - (U) Begin production planning for LST, for FY97 production decision. (NSP) - (U) Program office mission support requirements, (\$2,800) <p>(U) <u>FY 1997 Planned Program</u></p> <ul style="list-style-type: none"> - (U) Complete targeting pod LST and 40,000 ft. laser EMD effort for F-16 CAS program. (\$2,503) - (U) Flight test LST hardware modifications and 1998 Operational Flight Program (OFP) software changes resulting from LST and F-16 and F-15E software changes. (\$2,300) 			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY										DATE	PROJECT NO.
#5 - Engineering and Manufacturing Development										February 1995	2693
PE: #0604249F Night/Precision Attack											
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Proj 2693 LANTIRN	1,490	21,029	8,708	4,803	1,990	1,194	1,293	1,194	Continuing	TBD	
B. (U) Program Change Summary (\$ in Thousands)											
Previous President's Budget		1994		1995		1996	1997		Total Cost		
Appropriated Value		82,210		21,672		753	928		TBD		
Adjustments to Appropriated Value		0		21,672							
a. Below Threshold Reprogramming		1,490									
b. General Undistributed Reduction		0		-236							
c. SBIR				-407							
Adjustments to Budget Years since FY95 PB						7,955	3,875				
Current Budget Submit/President's Budget		1,490		21,029		8,708	4,803		TBD		
Change Summary Explanation:											
Funding: FY94 RDT&E funds deleted per congressional action. Reprogrammed FY94 RDT&E funds from PE 64212F (Aircraft Equipment Development) to PE 64249F to provide funding for program support costs. FY95 FFRDC, Non-FFRDC, University Research, and travel. FY96 and FY97 RDT&E increased by transfer from Low Altitude Navigation and Targeting Infra-red for Night (LANTIRN) production to support Laser Spot Tracker development.											
Schedule: No changes											
Technical: No changes											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY										DATE		PROJECT NO.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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PE 27249 LANTIRN Procurement	25,948	16,027	14,222	40,911	9,394	11,392	11,671	12,160	Continuing	TBD																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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Pod)	1	2	3	4	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431	2432	2433	2434	2435	2436	2437	2438	2439	2440	2441	2442	2443	2444	2445	2446	2447	2448	2449	2450	2451	2452	2453	2454	2455	2456	2457	2458	2459	2460	2461	2462	2463	2464	2465	2466	2467	2468	2469	2470	2471	2472	2473	2474	2475	2476	2477	2478	2479	2480	2481	2482	2483	2484	2485	2486	2487	2488	2489	2490	2491	2492	2493	2494	2495	2496	2497	2498	2499	2500	2501	2502	2503	2504	2505	2506	2507	2508	2509	2510	2511	2512	2513	2514	2515	2516	2517	2518	2519	2520	2521	2522	2523	2524	2525	2526	2527	2528	2529	2530	2531	2532	2533	2534	2535	2536	2537	2538	2539	2540	2541	2542	2543	2544	2545	2546	2547	2548	2549	2550	2551	2552	2553	2554	2555	2556	2557	2558	2559	2560	2561	2562	2563	2564	2565	2566	2567	2568	2569	2570	2571	2572	2573	2574	2575	2576	2577	2578	2579	2580	2581	2582	2583	2584	2585	2586	2587	2588	2589	2590	2591	2592	2593	2594	2595	2596	2597	2598	2599	2600	2601	2602	2603	2604	2605	2606	2607	2608	2609	2610	2611	2612	2613	2614	2615	2616	2617	2618	2619	2620	2621	2622	2623	2624	2625	2626	2627	2628	2629	2630	2631	2632	2633	2634	2635	2636	2637	2638	2639	2640	2641	2642	2643	2644	2645	2646	2647	2648	2649	2650	2651	2652	2653	2654	2655	2656	2657	2658	2659	2660	2661	2662	2663	2664	2665	2666	2667	2668	2669	2670	2671	2672	2673	2674	2675	2676	2677	2678	2679	2680	2681	2682	2683	2684	2685	2686	2687	2688	2689	2690	2691	2692	2693	2694	2695	2696	2697	2698	2699	2700	2701	2702	2703	2704	2705	2706	2707	2708	2709	2710	2711	2712	2713	2714	2715	2716	2717	2718	2719	2720	2721	2722	2723	2724	2725	2726	2727	2728	2729	2730	2731	2732	2733	2734	2735	2736	2737	2738	2739	2740	2741	2742	2743	2744	2745	2746	2747	2748	2749	2750	2751	2752	2753	2754	2755	2756	2757	2758	2759	2760	2761	2762	2763	2764	2765	2766	2767	2768	2769	2770	2771	2772	2773	2774	2775	2776	2777	2778	2779	2780	2781	2782	2783	2784	2785	2786	2787	2788	2789	2790	2791	2792	2793	2794	2795	2796	2797	2798	2799	2800	2801	2802	2803	2804	2805	2806	2807	2808	2809	2810	2811	2812	2813	2814	2815	2816	2817	2818	2819	2820	2821	2822	2823	2824	2825	2826	2827	2828	2829	2830	2831	2832	2833	2834	2835	2836	2837	2838	2839	2840	2841	2842	2843	2844	2845	2846	2847	2848	2849	2850	2851	2852	2853	2854	2855	2856	2857	2858	2859	2860	2861	2862	2863	2864	2865	2866	2867	2868	2869	2870	2871	2872	2873	2874	2875	2876	2877	2878	2879	2880	2881	2882	2883	2884	2885	2886	2887	2888	2889	2890	2891	2892	2893	2894	2895	2896	2897	2898	2899	2900	2901	2902	2903	2904	2905	2906	2907	2908	2909	2910	2911	2912	2913	2914	2915	2916	2917	2918	2919	2920	2921	2922	2923	2924	2925	2926	2927	2928	2929	2930	2931	2932	2933	2934	2935	2936	2937	2938	2939	2940	2941	2942	2943	2944	2945	2946	2947	2948	2949	2950	2951	2952	2953	2954	2955	2956	2957	2958	2959	2960	2961	2962	2963	2964	2965	2966	2967	2968	2969	2970	2971	2972	2973	2974	2975	2976	2977	2978	2979	2980	2981	2982	2983	2984	2985	2986	2987	2988	2989	2990	2991	2992	2993	2994	2995	2996	2997	2998	2999	3000	3001	3002	3003	3004	3005	3006	3007	3008	3009	3010	3011	3012	3013	3014	3015	3016	3017	3018	3019	3020	3021	3022	3023	3024	3025	3026	3027	3028	3029	3030	3031	3032	3033	3034	3035	3036	3037	3038	3039	3040	3041	3042	3043	3044	3045	3046	3047	3048	3049	3050	3051	3052	3053	3054	3055	3056	3057	3058	3059	3060	3061	3062	3063	3064	3065	3066	3067	3068	3069	3070	3071	3072	3073	3074	3075	3076	3077	3078	3079	3080	3081	3082	3083	3084	3085	3086	3087	3088	3089	3090	3091	3092	3093	3094	3095	3096	3097	3098	3099	3100	3101	3102	3103	3104	3105	3106	3107	3108	3109	3110	3111	3112	3113	3114	3115	3116	3117	3118	3119	3120	3121	3122	3123	3124	3125	3126	3127	3128	3129	3130	3131	3132	3133	3134	3135	3136	3137	3138	3139	3140	3141	3142	3143	3144

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February 1995
BUDGET ACTIVITY		PROJECT NO.	
#5 - Engineering Manufacturing & Development		2693	
PE NUMBER AND TITLE		PE: #0604249F Night/Precision Attack	
A. <u>Project Cost Breakdown (\$ in Thousands)</u>			
	<u>1994</u>	<u>1995</u>	<u>1996</u>
Laser Spot Tracker EMD	0	17,136	5,908
Laser Spot Tracker Risk Red.	1,300	1,400	0
Program Management Support	190	500	2,800
Flight Test	<u>0</u>	<u>1,993</u>	<u>0</u>
Total	1,490	21,029	<u>8,708</u>
			<u>1997</u>
			2,503
			0
			0
			<u>2,300</u>
			4,803

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1995
BUDGET ACTIVITY										PROJECT NO.	
PE NUMBER AND TITLE										2693	
#5 - Engineering and Manufacturing Development										PE: #0604249 Night/Precision Attack	
B. Budget Acquisition History and Planning Information (\$ in Thousands)											
Performing Organizations:											
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
<u>Product Development Organizations</u>											
Martin Marietta	Competitive Sep 80	373,800	378,647	350,400	1,300	18,536	5,908	2,503	0	378,647	
CFIF/FPIF/EPA											
Misc other contracts			78,700	78,700	0	0	0	0	0	78,700	
<u>Support and Management Organizations</u>											
Program Mgmt Support			26,100	17,800	0	0	2,100	0	0	4,200	24,100
Travel			15,700	12,300	190	500	700	0	0	1,500	15,190

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE						PROJECT NO.			
#5 - Engineering and Manufacturing Development		PE: #0604249 Night/Precision Attack						2693			
B. <u>Budget Acquisition History and Planning Information (\$ in Thousands) (Cont.)</u>											
<u>Test and Evaluation Organizations</u>											
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
Martin Marietta	Comp-CPAF/ FPIF/EPA	Sep 80	55,300	55,300	49,500	0	1,993	0	2,300	0	53,793
AFFTC	Project Order		25,400	25,400	25,400	0	0	0	0	0	25,400
AFOTEC	Project Order		3,500	3,500	3,500	0	0	0	0	0	3,500
<u>Government Furnished Property:</u> Not Applicable											
Subtotal Product Development			457,347	429,100	1,300	18,536	5,908	2,503	0	457,347	
Subtotal Support and Management			41,800	30,100	190	500	2,800	0	5,700	39,290	
Subtotal Test and Evaluation			84,200	78,400	0	1,993	0	2,300	0	82,693	
Total			583,347	537,600	1,490	21,029	8,708	4,803	5,700	579,330	

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BUDGET ACTIVITY

PE NUMBER AND TITLE

6 - Management Support 0604256F Threat Simulator Development

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	41,152	40,068	53,377	48,171	39,343	31,589	29,894	30,851	Continuing	TBD
3321 Electronic Warfare Ground Test Resources	37,012	33,313	38,987	33,280	26,420	22,473	23,160	23,864	Continuing	TBD
6510 Electronic Warfare Flight Test Resources	3,140	5,843	10,520	11,067	9,029	5,145	2,703	2,897	Continuing	TBD
2900 RATSCAT Upgrade (1)	0	0	1,990	1,990	1,990	1,990	1,990	1,989	Continuing	TBD
2907 Electronic Warfare Intel Support (2)	0	0	1,880	1,834	1,904	1,981	2,041	2,101	Continuing	TBD
1006 HAVE NOTE	1,000	912	0	0	0	0	0	0	Continuing	TBD

(1) This project was transferred from PE 0605708F, Nav/Radar/Sled Track Support, effective FY 96.

(2) This project was transferred from PE 0305887F, Electronic Combat Intelligence Support, effective FY 96.

Note: The following FY 94/95 funding totals represent what the totals would be including the two projects added in FY 96 (\$3,900 per year). These totals provide a more meaningful funding trend analysis for this PE:

FY 1994	FY 1995
45,052	44,317
Total PE	

(U) A. **Mission Description and Budget Item Justification:** This Program Element (PE) provides funding for the elements necessary to support the Air Force Electronic Warfare (EW) Test Process. This test process provides a methodology to ensure the effective disciplined and efficient testing of Air Force EW and avionics systems. Each capability or facility improvement is pursued in concert with the others so as to avoid duplicate capabilities while at the same time produce the proper mix of test resources needed to support the Air Force EW Test Process. This PE provides funding for the management and technical oversight of implementation activities, the Air Force-led tri-Service effort to establish a common modeling and simulation architecture, measurement facilities operation and improvements, hardware in the loop test facilities operation and improvements, installed system test facility improvement, and development and improvement of open air threat simulators for flight testing. This PE also provides funding to support the Radar Target Scatter (RATSCAT) program (supports Radar Cross Section measurement), and the Foreign Materiel Program, specifically, operational exploitation.

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BUDGET ACTIVITY

6 - Management Support

PE NUMBER AND TITLE

0604256F Threat Simulator Development

(U) B. Program Change Summary (\$ in Thousands):

(U) Previous President's Budget

(U) Appropriated Value

(U) Adjustments to Appropriated Value

 a. Cong Gen Reductions

 b. SBIR

 c. Omnibus or Other Above Threshold Reprogramming

 d. Below Threshold Reprogramming

(U) Adjustments to budget years since FY 95 PB

(U) Current Budget Submit/President's Budget

	FY 1994	FY 1995	FY 1996	FY 1997	Total
	41,631	40,075	61,681	50,516	Cost
		41,075			Cont
		-658			
		-768			
		-349			
	-479		-8,304	-2,345	
	41,152	40,068	53,377	48,171	Cont

(U) Change Summary Explanation:

Funding:

FY 96:

Project 2907, EW Intel Support +1,880

Project 2900, RATSCAT +1,990

FY 97:

Project 2907, EW Intel Support +1,834

Project 2900, RATSCAT +1,990

Schedule: For Electronic Warfare Ground Test Resources (3321), Real-time Electromagnetically Controlled Analyzer and Processor (REDCAP) (Sukhoi Airborne Warning and Control System/Battle Management Command Control and Communication (SUAWACS/BMC3) project completed in 1Q FY 94 (vs 3Q FY 95). Initiation of Air Force Electronic Warfare Evaluation System (AFEWES) Reconfigurable Surface-to-Air Missile (RSAM) upgrade project delayed from FY 94 to FY 95 and Initial Operational Capability (IOC) slipped from 3Q FY 96 to 4Q FY 97.

Technical: None.

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PE NUMBER AND TITLE

0604256F Threat Simulator Development

6 - Management Support

(U) C. Other Program Funding Summary (\$ in Thousands):

	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	To Compl	Total Cost
(U) PE 0605807F, (ECIT MILCON)			11,100	4,900					0	16,000
(U) PE 0604940D (CTEIP)		4,125	4,100	7,820	4,370	3,500	0	0	0	23,915
(U) PE 0604940D, Central T&E Improve. Prog.	0	2,500	8,000	8,000						18,500
(U) PE 0604940D, CTEIP	3,500	2,500	5,300	10,000	3,000					26,300

Related RDT&E:

- (U) PE 0604759F, Major T&E Investment
- (U) PE 0604735F, Combat Training Ranges
- (U) PE 0207122F, F-16
- (U) PE 0604239F, F-22
- (U) PE 0604231F, C-17
- (U) PE 0604226F, B-1

(U) D. Schedule Profile:

	1	FY 1994		4	1	FY 1995		4	1	FY 1996		4	1	FY 1997		4
		2	3			2	3			2	3			2	3	
(U) D. <u>Schedule 1 Rome</u> .																
(U) REDCAP Architecture/Link project upgrade IOC.																
(U) REDCAP IADS IOC.				x												
(U) AFEWES RAI upgrade IOC.							x									
(U) J-MASS releases.						x			x				x			
(U) Rome Lab multi-spectral capability to support F-22 complete.								x								
(U) ECIT MILCON complete.																x
(U) RSAM C IOC.																x
(U) REDCAP Option E IOC.																x
(U) ECIT IOC (4Q FY 98).																x
(U) AAIS Initial Oper. Cap. (3Q FY 99)																x

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6 - Management Support

0604256F Threat Simulator Development

PROJECT
3321

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
3321 Electronic Warfare Ground Test Resources	37,012	33,313	38,987	33,280	26,420	22,473	23,160	23,864	Continuing	TBD

(U) A. **Mission Description and Budget Item Justification:** The AF requires a comprehensive set of ground test facilities to implement the Air Force Electronic Warfare (EW) Test Process. In order that program risk throughout the weapon system acquisition life cycle is managed effectively and flight testing is conducted effectively and efficiently, a range of ground test capabilities from modeling and simulation architecture to the installed system test facility (ISTF) are required. The EW Test Process Support task provides for management, and coordinated technical oversight of the investment in and application of EW test facilities including analyses, studies and related documentation. The Joint Modeling and Simulation System (J-MASS) is an Air Force-led, Tri-Service project to establish a DoD-wide common digital simulation architecture in support of test and evaluation. This standard architecture will provide for credibility and correlation of test and evaluation results for all phases of the weapon system acquisition life cycle. The Hardware in the Loop (HITL) test facilities evaluate electronic support and countermeasures effectiveness prior to installation on the aircraft. Together the two AF HITL facilities, the Air Force Electronic Warfare Evaluation Simulator (AFEWES) and the Real Time Electromagnetic Digitally Controlled Analyzer and Processor (REDCAP) provide the ability to realistically evaluate hardware components against manned hardware threat representations early enough to affect final system design. The Electronic Combat Integrated Test (ECIT) project upgrades the AF ISTF at Edwards AFB, CA. The ISTF provides for thorough weapon system evaluation in a large instrumented anechoic chamber prior to and during flight test. Three sources of funding are required to support the ECIT upgrade. Funding from this program element will provide for Air Force-unique and general infrastructure. Air Force funds from the F-22, C-17, B-1, and F-16 programs will provide for aircraft-specific test requirements. OSD funding from the Central Test and Evaluation Improvement Program (CTEIP) will provide for joint Navy/Air Force development of the radar target generator, infrared (IR) target generator, and the communication, navigation, and identification friend or foe (CNF) simulator system. These three systems will be incorporated into both the AF ISTF and Navy ISTF at Patuxent River, MD. The antenna measurement and analysis facilities at Rome Laboratory, NY, supported by this project are transitioning to full customer funding beginning in FY 96.

(U) FY 1994 Program:

- (U) EW Test Process Support. Further analyzed existing test facility capabilities to support AF EW Test Process. Evaluated consolidation alternatives. Improved inter-facility correlation of test results. Investigated mechanisms to link test facilities for simultaneous testing. Improved EW Test Process implementation. (\$1,466)
- (U) J-MASS. Continued development of enhanced modeling and simulation architecture to support one-on-one simulations. Upgraded to latest Distributed Interactive Simulation (DIS) interface standard. (\$1,444)
- (U) AFEWES Operation and Upgrade. Continued operation of the AFEWES in support of Army, Navy, Air Force and non-DoD customers. Continued work on the Reconfigurable Airborne Interceptor (RAI) simulator to provide closed-loop simulations of three air-to-air threat radars. Continued work on the Test Director System (TDS) to provide improved test control and data analysis capabilities. Completed the Multiple Emitter Generator (MEG) which evaluates radar warning receivers and power managed Electronic Countermeasures (ECM) systems. (\$10,108)

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6 - Management Support

0604256F Threat Simulator Development

3321

- (U) REDCAP Operation and Upgrade. Continued REDCAP operations in support of Army, Navy, Air Force and non-DoD customers. Completed development of the ground Integrated Air Defense System (IADS), the new computer architecture segment, and the link capability. Began efforts to integrate the existing surveillance radars into the new computer architecture. (\$11,057)
 - (U) ECIT. Developed a preliminary architecture for a generic EW and avionics installed system test facility. Conducted technology development and trade studies of alternatives for risk reduction, leading to issue of the draft Request for Proposal. (\$9,791)
 - (U) ECCM. Completed Guided Weapons Evaluation Facility (GWEF) Global Positioning System (GPS) simulation to provide time-space position information for Electronic Counter-counter Measures (ECCM) analysis. Completed develop of a Reconfigurable Ground Jammer for weapons ECCM testing. (\$932)
 - (U) Rome Laboratory Antenna Measurement Facilities. Continued operation, development and improvement of ground and airborne far field antenna measurement and analysis facilities in support of SPOs and DOD agencies and contractors. Completed computer, data and fiber optic network linking Rome Lab facilities and customers. Established new low reflectivity test range and provided 967,000 pattern measurements for F-22 CNI and EW PDRs. (\$2,214)
- (U) FY 1995 Planned Program:
- (U) EW Test Process Support. Begin the definition of a test facilities network that will support the definition of a network of test facilities that will support the full application of the EW Test Process in each phase of the DoD System Acquisition Process for federated and integrated avionics systems. (\$1,000)
 - (U) J-MASS. Release software upgrade. Continue development of enhanced modeling and simulation architecture to support one-on-one simulations. Develop real-time applications and few-on-few modeling capability. (\$2,459)
 - (U) AFEWES Operation and Upgrade. Continue operation of the AFEWES in support of Army, Navy, Air Force and non-DoD customers. Complete TDS. Continue work on the RAI. Begin development of Reconfigurable Surface-to-Air Missile (RSAM) simulator. Integrate the MEG with the RAI simulator to provide multiple threat signals to the jammer being tested against the RAI. (\$4,840)
 - (U) REDCAP Operation and Upgrade. Continue REDCAP operations in support of Army, Navy, Air Force and non-DoD customers. Complete integration and documentation efforts between existing REDCAP radars and the new/upgraded REDCAP facility architecture. Initiate Option E, the development of simulators for advanced surveillance radars specifically designed to detect low-flying or stealth-type aircraft. (\$12,000)
 - (U) ECIT. Release Request for Proposal, conduct source selection, and award risk-reduction contract for generic EW and avionics installed system test facility. (\$9,208)
 - (U) ECCM. Acquire additional millimeter wave (MMW) simulator channel for ECCM efforts in GWEF, and procure for PRIMES a Scenario Controller, an EO/IR Imaging simulator, and an Advanced Avionics Simulator for stores management. (\$1,806)
 - (U) Rome Laboratory Antenna Measurement Facilities. Continue operation, development and improvement of ground and airborne far-field antenna measurement and analysis facilities. Optimize range to support F-22 Aperture Development Program. Provide capability to support AF Special Operations Command, Warner Robins ALC, and 412TW C-130 Gunship EW and Advanced Signal Collection Upgrade Programs. Develop capability to support the F-15 production decision on Manned Destructive Suppression of Enemy Air Defenses Program. Modify B-1B testbed to support the Conventional Mission Upgrade Program. (\$2,000)

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BUDGET ACTIVITY		PE NUMBER AND TITLE	PROJECT
6 - Management Support		0604256F Threat Simulator Development	3321
<p>(U) <u>FY 1996 Planned Program:</u></p> <ul style="list-style-type: none"> - (U) EW Test Process Support. Continue the definition of a test facilities network that will provide definition of a network of test facilities that will support the full application of the EW Test Process in each phase of the DoD System Acquisition Process for federated and integrated avionics systems. Formulate an investment strategy and implementation plan to realize this network. (\$1,500) - (U) J-MASS. Develop capability to run simulations composed of models that can be written in a variety of languages. Integrate MOSAIC models to provide an infrared simulation capability. Integrate Suppressor to provide mission training. Continue providing J-MASS user support and training. (\$2,284) - (U) AFEWES Operation and Upgrade. Continue AFEWES operations in support of Air Force, Army, Navy and non-DoD test customers. Continue the development of the RSAM simulator. (\$7,592) - (U) REDCAP Operation and Upgrade. Continue REDCAP operations in support of Air Force, Army, Navy and non-DoD test customers. Continue acquisition and integration of advanced surveillance radars under Option E. (\$7,500) - (U) ECIT. Complete risk-reduction phase and select contractor for full-scale development of generic EW and avionics installed system test facility. Begin military construction of ECIT facilities. (Source of funds for MILCON is PE 0605807F) (\$20,111) - (U) Rome Labs. The antenna pattern measurement activities of this facility will transition to full funding by customers. <p>(U) <u>FY 1997 Planned Program:</u></p> <ul style="list-style-type: none"> - (U) EW Test Process Support. Begin implementation of the EW test facilities network. Continue the analysis and planning of upgrades to the network to improve implementation of the EW Test Process and support emerging EW technologies. (\$1,536) - (U) J-MASS. Improve model and scenario development tools, such as visual programming, graphical user interface, hardware-in-the-loop and man-in-the-loop, and data management capabilities. Increase the number of hardware platforms that J-MASS can support. Support a growing library of models, and provide user training, support and documentation. (\$2,058) - (U) AFEWES Operation and Upgrade. Continue AFEWES operations in support of Air Force, Army, Navy and non-DoD test customers. Complete RSAM simulator development. (\$3,069) - (U) REDCAP Operation and Upgrade. Continue REDCAP operations in support of Air Force, Army, Navy and non-DoD test customers. Continue the acquisition and integration of advanced surveillance radars under Option E. (\$6,936) - (U) ECIT. Continue development of infrastructure and generic EW and avionics installed system test capabilities. Complete military construction efforts for ECIT facilities (funding source for MILCON is PE 0605807F). (\$19,681) 			

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6 - Management Support

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3321

(U) B. Program Change Summary (\$ in Thousands):

	FY 1994	FY 1995	FY 1996	FY 1997	Total
(U) Previous President's Budget	37,491	32,962	46,111	35,533	Cost
(U) Appropriated Value		33,962			TBD
(U) Adjustments to Appropriated Value					
a. Cong Gen Reductions		-300			
b. SBIR		-461			
c. Omnibus or Other Above Threshold Reprogramming		-349			
d. Below Threshold Reprogramming	-479				
(U) Adjustments to budget years since FY 95 PB			-7,124	-2,253	
(U) Current Budget Submit/President's Budget	37,012	33,313	38,987	33,280	TBD

(U) Change Summary Explanation:

Funding:

FY 95 funding changes (Congressional):

REDCAP +5,000

AFEWES -4,000

FY 96/97 Funding: ECCM and Rome Labs were zeroed and J-MASS was reduced due to overall Air Force budget constraints. Antenna pattern measurement activities at Rome Labs will be totally customer funded beginning in FY 96. Sources for customer funding for ECIT (\$5,600 in FY 96 and \$5,400 in FY 97) were identified (C-17, F-16, B-1, F-22), and transferred to this PE.

Schedule: REDCAP SUAWACS/BMC3 project completed in 1Q FY 94 (vs 3Q FY 95). Initiation of AFEWES RSAM upgrade project delayed from FY 94 to FY 95 and IOC slipped from 3Q FY 96 to 4Q FY 97

Technical: None.

(U) C. Other Program Funding Summary (\$ in Thousands):

	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	To Compl	Total Cost
PE 0605807F, (ECIT MILCON)			11,100	4,900					0	16,000
PE 0604940D, (CTEIP)		4,125	4,100	7,820	4,370	3,500	0	0	0	23,915

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3321

Related RDT&E:

(U) PE 0604759F, Major T&E Investment
 (U) PE 0604735F, Combat Training Ranges
 (U) PE 0207122F, F-16
 (U) PE 0604239F, F-22
 (U) PE 0604231F, C-17
 (U) PE 0604226F, B-1

(U) D. Schedule Profile:

	FY 1994			FY 1995			FY 1996			FY 1997		
	1	2	3	4	1	2	3	4	1	2	3	4
(U) REDCAP Architecture/Link project upgrade IOC.												
(U) REDCAP IADS IOC.				x								
(U) AFEWES RAI upgrade IOC.												
(U) J-MASS releases.												
(U) Rome Lab multi-spectral capability to support F-22 complete.												
(U) ECIT MILCON complete.												
(U) RSAM C IOC.												
(U) REDCAP Option E IOC.												
(U) ECIT IOC (4Q FY 98).												

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X
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PROJECT

6 - Management Support

0604256F Threat Simulator Development

6510

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
6510 Electronic Warfare Flight Test Resources	3,140	5,843	10,520	11,067	9,029	5,145	2,703	2,897	Continuing	TBD

(U) **A. Mission Description and Budget Item Justification:** This project funds those resources, including simulators and instrumentation, necessary to support flight test in an open-air environment. It includes the development of advanced signal sources to represent ground and airborne threats and the upgrade of existing threat simulators to maintain currency with the latest intelligence. This project funds the development of an Advanced Airborne Interceptor Simulator (AAIS) in conjunction with the Central Test and Evaluation Improvement Program (CTEIP). CTEIP funds the non-recurring engineering (NRE) portion of AAIS development, whereas this project acquires the AAIS hardware.

(U) FY 1994 Program:

- (U) Electromagnetic Test Environment (EMTE). Continued incorporation of the latest intelligence information into the SADS V (Missile), SADS X, SADS XI, and SADS XI (Missile). Incorporated the latest intelligence information into simulators for threats for which real systems are not available. (\$2,177)
- (U) AAIS. Conducted AF analyses of technical approaches for meeting requirements, evaluating existing simulation and actual hardware systems, and preparing request for proposal. (\$963)

(U) FY 1995 Planned Program:

- (U) EMTE. Acquire SADS XII antenna. Continue instrumentation and closed-loop missile simulation on foreign surface-to-air missile (SADS VM). Incorporate the latest intelligence information into simulators for threats for which real systems are not available. (\$2,277)
- (U) AAIS. Award contract to develop, fabricate, integrate, and test an airborne test simulator to be completed 4Q FY 98. (\$3,566)

(U) FY 1996 Planned Program:

- (U) AAIS. Complete design phase and begin fabrication phase. (\$10,520)

(U) FY 1997 Planned Program:

- (U) AAIS. Complete fabrication phase. Begin preparation for integration/testing phases. (\$11,067)

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PE NUMBER AND TITLE

6 - Management Support

0604256F Threat Simulator Development

PROJECT

2900

	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
COST (In Thousands)										
2900 RATSCAT Upgrade (1)	0	0	1,990	1,990	1,990	1,990	1,990	1,989	Continuing	TBD

(1) This project transferred from PE 0605708F, Nav/Radar/Sled Track Support, effective FY 96. (FY 94/95 funding was \$2,000 per year.)

(U) A. Mission Description and Budget Item Justification: This project provides improvements to the Radar Target Scatter (RATSCAT) facility in order to assure support to address radar cross section (RCS) measurement requirements of DoD customers. Key areas of improvement include radar upgrades, standardization of data processing equipment and techniques, bistatic testing, pylon skirts with low radar returns, low frequency measurement capability upgrades, advanced real-time radar calibration equipment, security system upgrades, efficiency related equipment. The DoD continues an aggressive R&D program to achieve low-observable technology. This project provides a continuous effort to allow test technology to keep pace with these activities. OSD funding through the Central Test and Evaluation Improvement Program (CTEIP) provides funding for Data Acquisition and Processing System (DAPS), Bistatic Coherent Measurement System (BICOMS), and the next generation pylons. For DAPS, CTEIP funds the hardware, development, instrumentation, and spares. For BICOMS CTEIP funds part of the hardware and labor. For the next generation pylons, CTEIP funds the pylons.

(U) FY 1994 Program:

- (U) Completed final acquisition phase for RATSCAT Advanced Measurement System VHF/UHF Measurement System (RVUMS), provided support for the Advanced Static RCS project, initiated deficiency corrections for Integrated Radar Measurement System (IRMS), and completed fabrication of radar for the West Range. (\$2,000)

(U) FY 1995 Planned Program:

- (U) Procure RAMS security system, procure risk reduction hardware for North Range Radar (previously Integrated Radar Measurement System) efficiency upgrades, complete the preliminary design review for BICOMS, and complete acquisition of advanced technology pylon skirts. (\$2,000)

(U) FY 1996 Planned Program:

- (U) Complete development of DAPS for Mainsite and RATSCAT Advanced Measurement System (RAMS) low frequency radars. Continue North Range Radar improvements. Initiate RAMS radar development to improve the dynamic range and system sensitivity. (\$1,990)

(U) FY 1997 Planned Program:

- (U) Continue RAMS radar system design and hardware purchase. Complete improvements to the North Range Radar. (\$1,990)

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0604256F Threat Simulator Development

PROJECT

2900

(U) B. Program Change Summary (\$ in Thousands):

	FY 1994	FY 1995	FY 1996	FY 1997	Total Cost Cont
(U) Previous President's Budget	N/A	N/A	1,990	1,990	
(U) Appropriated Value					
(U) Adjustments to Appropriated Value					
(U) Current Budget Submit/President's Budget	N/A	N/A	1,990	1,990	Cont
(U) Funding from PE 0605708F	2,000	2,000			

(U) Change Summary Explanation:

Funding: This project is covered under PE 0605708F for FY 1994 and FY 1995.

Schedule: None.

Technical: None.

(U) C. Other Program Funding Summary (\$ in Thousands):

	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	To Compl	Total Cost
(U) PE 0604940D, CTEIP	3,500	2,500	5,300	10,000	3,000	0	0	0	0	26,300

(U) D. Schedule Profile: Not applicable.

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PROJECT

6 - Management Support

0604256F Threat Simulator Development

2907

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
2907 Electronic Warfare Intel Support (2)	0	0	1,880	1,834	1,904	1,981	2,041	2,101	Continuing	TBD

(1) This project was transferred from PE 0305887F, Electronic Combat Intelligence Support, effective FY 96. (FY 94 funding was \$2,100 and FY 95 funding was \$1,788.)

(U) A. Mission Description and Budget Item Justification: This project provides funding to support Foreign Materiel Operational Test and Evaluation (FMOT&E) which ensures the ability of operational commands to test and develop effective Electronic Attack/Electronic Protection (EA/EP) and tactics. Funds are required for: deployment of blue systems to test facilities, travel for personnel to the test sites to evaluate and validate test results real-time, reimbursement for industrial-funded range and laboratory costs; costs for instrumentation of blue systems; contracted engineering support for the conduct of tests and subsequent reporting. Funding for this program is required to prevent future aircraft losses due to improper and inaccurate aircrew tactics (e.g., lack of evasive action or proper tactics training to avoid missile attack).

(U) FY 1994 Program:

- (U) See PE 0305887F.

(U) FY 1995 Planned Program:

- (U) See PE 0305887F.

(U) FY 1996 Planned Program:

- (U) Funds testing for foreign materiel operational exploitation. Extensive evaluations and reporting to be accomplished. (\$1,880)

(U) FY 1997 Planned Program:

- (U) Continues funding for testing foreign materiel operational exploitation. Extensive evaluations and reporting to be accomplished. (\$1,834)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)					DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE			PROJECT	
6 - Management Support		0604256F Threat Simulator Development			2907	
(U) B. <u>Program Change Summary (\$ in Thousands):</u>						
(U) Previous President's Budget	FY 1994	FY 1995	FY 1996	FY 1997	Total	
(U) Appropriated Value	N/A	N/A	1,889	1,843	Cost	N/A
(U) Adjustments to Appropriated Value						
(U) Adjustments to budget years since FY 95 PB			-9	-9		
(U) Current Budget Submit/President's Budget	N/A	N/A	1,880	1,834		N/A
Funding from PE 0305887F:	2,100	1,788				
(U) Change Summary Explanation:						
Funding: Transferred from PE 0305887F, effective FY 96.						
Schedule: None.						
Technical: None.						
(U) C. <u>Other Program Funding Summary (\$ in Thousands):</u> Not applicable.						
(U) D. <u>Schedule Profile:</u> Not applicable.						

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
6 - Management Support		0604256F Threat Simulator Development								1006	
	COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
1006	HAVE NOTE	1,000	912	0	0	0	0	0	0	Continuing	TBD
<p>(U) A. Mission Description and Budget Item Justification: Developed, improved and supported the Rome Laboratory Electromagnetic Radiation (EMR) test facilities including an anechoic chamber for free space electromagnetic environments simulations; a mode-tuned reverberation chamber for rapid "quick look" evaluations; a small anechoic chamber used for subsystem evaluations; and a radio frequency (RF) and microwave instrumentation development facility. The electromagnetic susceptibility data produced at these facilities is used to perform weapon system and C31 system vulnerability assessments and update test methods, acquisition specifications, hardening design guidelines, and maintenance of technical orders. For FY 96 and the out years, this project is transitioning to full customer funding.</p> <p>(U) FY 1994 Program:</p> <ul style="list-style-type: none"> (U) Continued operation, development and improvement of Electromagnetic Environmental Effects assessment facility. Provided capability for vulnerability assessment of Advanced Medium Range Air-to-Air Missile Producibility Enhancement Program (APREP) hardware. Provided capability for vulnerability assessment of DSU-33C Proximity Fuse. Completed vulnerability assessment of Sensor Fuzed Weapon (SFW) Producibility Transition Program (PTP) hardware. Published MIL-HDBK-335 update. Completed Automated Data Acquisition and Control System (ADACS) software transfer and validation for AMRAAM vulnerability assessment. Established support to Joint Direct Attack Missile (JDAM) Systems Program Office (SPO). (\$1,000) <p>(U) FY 1995 Planned Program:</p> <ul style="list-style-type: none"> (U) Continue operation, development and improvement of Electromagnetic Environmental Effects Assessment Facilities. Configure anechoic chamber to support vulnerability assessment of SFW Pre-planned Product Improvement (P³I) hardware. Procure replacement of \$400 multiband high-power traveling wave tube power supply and modulator. Prepare and instrument anechoic chamber facility to support JDAM SPO. (\$912) <p>(U) FY 1996 Planned Program:</p> <ul style="list-style-type: none"> (U) Becomes fully customer funded. <p>(U) FY 1997 Planned Program:</p> <ul style="list-style-type: none"> (U) Fully customer funded. 											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)				DATE	PROJECT
BUDGET ACTIVITY	PE NUMBER AND TITLE				
6 - Management Support	0604256F Threat Simulator Development			February 1995	1006
(U) B. <u>Program Change Summary (\$ in Thousands):</u>					
(U) Previous President's Budget	FY 1994	FY 1995	FY 1996	FY 1997	Total
(U) Appropriated Value	1,000	912	918	924	Cost
(U) Adjustments to Appropriated Value					Cont
(U) Adjustments to budget years since FY 95 PB			-918	-924	
(U) Current Budget Submit/President's Budget	1,000	912	0	0	N/A
(U) Change Summary Explanation:					
Funding: Becomes fully customer funded beginning in FY 96.					
Schedule: None.					
Technical: None.					
(U) C. <u>Other Program Funding Summary (\$ in Thousands):</u> Not applicable.					
(U) D. <u>Schedule Profile:</u> Not applicable.					

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

#6 - Management Support

#0604258F Target Systems Development

COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	9,882	7,346	5,362	5,234	5,427	5,656	5,823	5,997	Cont	TBD
Full Scale Aerial Target System/3165	7,307	6,457	1,185	0	0	0	0	0	0	51,113
Target Payloads/2459	2,575	889	4,177	5,234	5,427	5,656	5,823	5,997	Cont	TBD

(U) A. Mission Description and Budget Item Justification

Aerial Targets are used to determine air-to-air weapons effectiveness and mission proficiency of our tactical systems against enemy aircraft. The overall objective is to improve air-to-air weapon system accuracy and reliability by developing aerial target systems for Air Force weapon system test and evaluation. This effort is in the research category/budget activity for Management Support, since it provides overall support to research and development activities. The acquisition strategy is competitive, cost plus contracts.

(U) B. Program Change Summary (\$ in Thousands)

	1994	1995	1996	1997	Total Cost TBD
Previous President's Budget	10,154	7,576	5,859	5,840	
Appropriated Value	10,154	7,576			
Adjustments to Appropriated Value					
a. Congressional General Reduction	-102	-88			
b. Below Threshold Reprogramming (BTR)	-54				
c. Small Business Innovative Research (SBIR)	-116	-142*	-497	-608	
Adjustment to Budget Years Since FY95 Budget					
Current Budget Submit/President's Budget	9,882	7,346	5,362	5,234	TBD

* SBIR adjustments not reflected in ABIDES database.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY				PE NUMBER AND TITLE									
#6 - Management Support				#0604258F Target Systems Development									
(U) B. <u>Program Change Summary Continued (\$ in Thousands)</u>													
Change Summary Explanation:													
Funding: Program reduced in FY96-97 to fund higher priority requirements.													
Schedule: None													
Technical: FY97 cuts reduced the scope of new technology upgrades and the RF survivability effort and technology upgrades for both Full Scale Aerial Targets and Subscale Aerial Targets.													
(U) C. <u>Other Program Funding Summary (\$ in Thousands)</u>													
							</						

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE _____

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

#6 - Management Support

#0604258F Target Systems Development

(U) D. <u>Schedule Profile</u>		1994				1995				1996				1997			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Full Scale Aerial Target Systems																	
QF-4E Contract Award 2/92																	
Developmental Test & Evaluation (DT&E)		X*			X**												
Operational Test & Evaluation (OT&E)					X*	X**											
White Sands DT&E/OT&E						X*	X**										
Production Decision																	
Deliveries Begin							X				X				X		
IOC																	
Target Payloads																	
NAVS																	
Hardware (HW) Preliminary Design																	
Review (PDR)/Software (SW) Software																	
Specification Review (SSR)				X													
SW PDR						X											
HW Critical Design Review (CDR)						X											
SW CDR							X										
Quality Testing								X*	X**								
Ground Accuracy Tests										X**							
Flight Tests										X*							
Milestone III											X**						
Production Option														X			

Note: X^* = Milestone Beginning X^{**} = Milestone Completion

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
PROJECT NO.		PE NUMBER AND TITLE										PROJECT NO.	
#6 - Management Support		#0604258F Target Systems Development										3165	
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost			
Full Scale Aerial Target System/3165	7,307	6,457	1,185	0	0	0	0	0	0	0	51,113		
<p>(U) A. Mission Description and Budget Item Justification</p> <p>The Air Force is lead for a tri-service program for the development of the QF-4E full scale aerial target. The QF-4E is the follow-on to the QF-106 full scale target used today. The final buy of the QF-106 was in FY93 with deliveries complete in 4Qtr FY94. The first QF-4E production is scheduled for delivery in 2Qtr FY96 and is funded by PE 35116F procurement. Additional production options are scheduled to begin delivery in 2Qtr97 and 2Qtr98 respectively. The first QF-4E will be tested and operated at Tyndall AFB, FL to meet over-water test requirement, and then tested at the White Sands Missile Range, NM to meet over-land test requirement. The Navy will begin using the QF-4E in FY99. Full-scale targets are fully representative of the threat, with realistic maneuvering performance, radar cross section and afterburning engine infrared (IR) signature. The overall objective is to improve air-to-air weapon system accuracy and reliability by developing aerial target systems for Air Force weapon system test and evaluation. Public law mandates all new or upgraded weapon systems must demonstrate lethality against a representative threat before approval to proceed with procurement. In addition to AMRAAM, AIM-7, AIM-9X, and F-22, full-scale targets are also used to support US Army air defense test and evaluation programs such as the Divisional Air Defense follow-on program, Stinger, Patriot and Improved Hawk.</p> <p>(U) FY 1994</p> <ul style="list-style-type: none"> - (U) Complete development of electronic countermeasure (ECM) pod (\$100) - (U) Complete development of basic flight tests (\$4,200) - (U) Complete development of tri-service flight termination system (NSP) - (U) Completed contractor flight tests (NSP) - (U) Conducted flight readiness review (NSP) - (U) Conducted preliminary software physical configuration audit (PCA) (NSP) - (U) Test and Evaluation Support (\$2,882) - (U) Began DT&E/OT&E at Tyndall AFB for the integrated QF-4E system (NSP) - (U) Complete testing of mobile control station (NSP) - (U) Other technical support (\$125) 													

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE	PROJECT NO.
#6 - Management Support		#0604258F Target Systems Development	3165
<p>(U) <u>FY 1995</u></p> <ul style="list-style-type: none"> - (U) Complete development of basic system through Drone Formation Control System testing (\$4,000) - (U) Conduct Production Readiness Review #2 (NSP) - (U) Make production decision (exercise production option #1) (NSP) - (U) Conduct final software Physical Configuration Audit (PCA) (NSP) - (U) Complete Engineering and Manufacturing Development (EMD) phase of contract (NSP) - (U) Test and Evaluation Support (\$2,457) - (U) Begin DT&E/IOT&E at White Sands Missile Range for the integrated QF-4E system (NSP) <p>(U) <u>FY 1996</u></p> <ul style="list-style-type: none"> - (U) Complete EMD phase of program (\$1,185) - (U) Conduct drone operations training (NSP) - (U) Conduct QF-4E PCAs (NSP) - (U) Deliver FSAT system level III drawing package (NSP) - (U) Exercise production option #2 (NSP) - (U) Receive first production QF-4E target (NSP) <p>(U) <u>FY 1997</u></p> <ul style="list-style-type: none"> - (U) No funds required. 			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY			PE NUMBER AND TITLE					PROJECT NO.					
#6 - Management Support			#0604258F Target Systems Development					3165					
(U) B. <u>Program Change Summary (\$ in Thousands)</u>													
Previous President's Budget			1994	1995	1996	1997	Total						
Appropriated Value			7,572	6,610	1,191	0	Cost						
Adjustments to Appropriated Value			7,572	6,610			TBD						
a. Congressional General Reduction			-95	-64									
b. Below Threshold Reprogramming (BTR)			-54										
c. Small Business Innovative Research (SBIR)			-116	-89*									
Adjustment to Budget Years Since FY95 Budget					-6	0							
Current Budget Submit/President's Budget			7,307	6,457	1,185	0	51,113						
* SBIR adjustments not reflected in ABIDES database.													
Change Summary Explanation: FY96 reduced to reflect revised inflation.													
(U) C. <u>Other Program Funding Summary (\$ in Thousands)</u>													
			1994	1995	1996	1997	1998	1999	2000	2001	To	Total	
											Compl	Cost	
PE 35116F: Appropriation: Weapon Procurement, AF Budget Activity: 4, Program Title: Target Drones													
WSC: M04AQF (QF-4E)			4,653	22,872	28,643	26,029	30,048	31,272	32,210	33,176	Cont	TBD	
(U) D. <u>Schedule Profile</u>													
Refer to Program Element Schedule page 3, section D.													

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE										February 1995	
PROJECT NO.										2459	
PE NUMBER AND TITLE										#0604258F Target Systems Development	
BUDGET ACTIVITY										#6 - Management Support	
COST (\$ in Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Target Payloads/2459		2,575	889	4,177	5,234	5,427	5,656	5,823	5,997	Cont	TBD

(U) A. Mission Description and Budget Item Justification

Specialized payload subsystems are developed for full-scale and subscale targets for missile scoring, electronic and infrared (IR) countermeasures, and radar and IR signature augmentation. Current scoring systems provide only miss distance information. Noncooperative Airborne Vector Scoring (NAVS), is the tri-service system under development provides missile path and position relative to the target at point of closest approach, which are essential to accurately calculate the probability of kill. IR signature augmentation on subscale targets provides a signature representative of threat military jet engines. Electronic and IR countermeasures (ECM & IRCM) include systems such as chaff and flare dispensers. Drone Radar Cross Section (RCS) Electronic Enhancement Mechanism (DREEM) provides RCS enhancement of Aerial Targets to replicate threats, and is used for Developmental Test & Evaluation/Initial Operational Test & Evaluation of air-to-air missiles, air-to-air Weapons Systems Evaluation Program (WSEP). The acquisition strategy is competitive, cost plus contracts.

(U) FY 1994

- (U) Continued to participate in tri-service development of NAVS (\$1,500)
- (U) Initiate integrated schedule (\$500)
- (U) Collect and compile target signature data for use in test planning and incorporate into target handbook (\$200)
- (U) Initiate Interim Vector Scorer (\$375)

(U) FY 1995

- (U) Continue to participate in tri-service development of NAVS (\$500)
- (U) Collect and compile target signature data for use in test planning (\$200)
- (U) Initiate radio frequency (RF) survivability efforts (\$100)
- (U) Other technical support (\$89)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#6 - Management Support	#0604258F Target Systems Development	2459	
<p>(U) <u>FY 1996</u></p> <ul style="list-style-type: none"> - (U) Complete Engineering and Manufacturing Development and Flight Test in tri-service development of Noncooperative Airborne Vector Scoring (NAVS) (\$1,100) - (U) Initiate DEMVAL for Drone Radar Cross Section (RCS) Electronic Enhancement Mechanism (DREEM) (\$2,177) - (U) Initiate Follow-on aerial target study (\$300) - (U) Collect and compile target signature data for use in test planning (\$300) - (U) Continue radio frequency survivability efforts (\$200) - (U) Initiate Alternative Countermeasure program (\$100) <p>(U) <u>FY 1997</u></p> <ul style="list-style-type: none"> - (U) Continue Follow-on aerial targets study (\$1,500) - (U) Continue DEMVAL for DREEM (\$2,634) - (U) Continue Alternative Countermeasure program (\$300) - (U) Continue signature measurement and handbook efforts (\$500) - (U) Initiate upgrades for subscale electronics (\$300) 			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE		PROJECT NO.	
February 1995		2459	
BUDGET ACTIVITY	PE NUMBER AND TITLE		
#6 - Management Support	#0604258F Target Systems Development		
(U) B. <u>Program Change Summary (\$ in Thousands)</u>			
Previous President's Budget	1994	1995	1996
Appropriated Value	2,582	966	4,668
Adjustments to Appropriated Value	2,582	966	5,840
a. Congressional General Reduction	-7	-24	
b. Small Business Innovative Research (SBIR)		-53*	
Adjustment to Budget Years Since FY95 Budget			-606
Current Budget Submit/President's Budget	2,575	889	5,234
			TBD
* SBIR adjustments not reflected in ABIDES database.			
Change Summary Explanation:			
Funding:	Program reduced	in FY96-97 to fund higher priority requirements.	
Schedule:	None		
Technical: FY97 cuts reduced the scope of new technology upgrades and the RF survivability effort and technology upgrades for both Full Scale Aerial Targets and Subscale Aerial Targets.			
(U) C. <u>Other Program Funding Summary (\$ in Thousands)</u>	Not Applicable		
(U) D. <u>Schedule Profile</u>	Refer to Program Element Schedule page 3, section D.		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY										DATE	
										February 1995	
PE NUMBER AND TITLE											
#7 - Operational Systems Development										#0604268F ** - Aircraft Engine Component Improvement Program (CIP)	
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
	102,542	92,564	103,700	105,600	99,523	101,825	104,880	108,026	CONT	CONT	
Total Program Element (PE) Cost *											
A. (U) <u>Mission Description and Budget Item Justification</u>											
<p>(U) CIP provides critical sustaining engineering support (only source) for in-service Air Force engines to maintain flight safety (highest priority), to correct service revealed deficiencies, to improve system Operational Readiness (OR) and Reliability and Maintainability (R&M), to reduce engine Life Cycle Cost (LCC), and to keep older engines operational. Historically, aircraft systems change missions, tactics, and environments to meet changing threats throughout their lives. Numerous new problems can develop in the engines through actual use during deployment, production, and service, and CIP provides the only funds to develop fixes for these field problems. CIP starts with acceptance of the first production engine and continues over the engine's life, gradually decreasing to a minimum level (safety/depot repairs) sufficient to keep older inventory engines operational. CIP addresses usage and life not covered by engine warranty and enables the Air Force to obtain improved warranties when manufacturers incorporate CIP improvements into production engines. Since changes continue throughout a system's operational life, CIP must be maintained at a level to provide the engineering support to make changes which are essential for satisfactory system performance at affordable costs. CIP ensures continued improvements in engine R&M factors, which reduces outyear support costs. Typically, CIP efforts reduce outyear Operations and Maintenance (O&M) and spares costs by a ratio greater than 21 to 1. O&M and spares budgeting assumes a viable CIP effort is in place. Without the outyear cost avoidance provided by CIP, outyear support costs would have to be increased drastically. CIP funding is driven by field events and types/maturity of engines, not by the total engine quantity. This Program is in Budget Activity/Research Category Operational Systems Development as most efforts support currently operating systems.</p> <p>* Funding for FY96-01 transitioned from Budget Activity/Research Category Engineering and Manufacturing Development.</p> <p>** PE number will change to 0207268F with the submission of the FY1997 President's Budget.</p>											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	
#7 - Operational Systems Development	#0604268F - Aircraft Engine Component Improvement Program (CIP)	
<p>A. (U) <u>Mission Description and Budget Item Justification</u> (Cont'd)</p> <p>(U) There are no individual Projects within this PE. The following describe the overall Program : (Dollars in Thousands)</p> <p>(U) <u>FY 1994 Program:</u></p> <p>(U) - Continued effort to reduce air aborts, aircraft safety incidents, non-mission capable rates, scheduled and unscheduled engine removals, maintenance man hours, and overall costs. Completed 7744 test hours (6532 sea level, 1212 altitude, 82 flight tests) to analyze, verify and qualify CIP tasks. Also completed 637 CIP tasks (237 redesign tasks, 317 repair development tasks, 83 analysis tasks) generating \$2.7 Billion in LCC (Life Cycle Cost) savings. (Total program \$102,542)</p> <p>(U) - F100 (F-16/F-15) Redesign F100-PW-229 second High Pressure Turbine Vane for improved durability. Provides full 4300 TAC (Total Accumulated Cycle) part life and reduces the probability of turbine failure. - \$ 23.0 Million LCC saving. (\$303)</p> <p>(U) - F110 (F-16) Developed Digital Engine Control for the F110-GE-100. Reduces In Flight Shutdown rate by half (.14 to .07). - \$92.0 Million LCC savings. (\$2,017)</p> <p>(U) - F101 (B-1) Redesign fuel/lube system bolt flanges. Reduces oil leak potential and IFSD rate. LCC saving \$10M. (\$250)</p> <p>(U) - The balance of the program (some 634 separate tasks) supported improvements to the reliability and maintainability of 46 different engine types in Air Force service, and the testing and verification of those improvements. (\$99,972)</p> <p>(U) <u>FY 1995 Planned Program:</u></p> <p>(U) - Continue effort to increase engine operability and supportability, reduce air aborts, aircraft safety incidents, non-mission capable rates, scheduled and unscheduled engine removals, maintenance man hours, and overall costs. Program will include 9296 test hours (8291 sea level, 890 altitude), to analyze, verify and qualify CIP tasks. (Total program \$92,564)</p> <p>(U) - There will be 675 CIP tasks (231 redesign tasks, 373 repair development tasks, 71 analysis tasks) generating \$2.5 Billion in LCC savings. (NSP)</p> <p>(U) - A typical task is the completion of the F110-GE-100 Digital Engine Control development and its Flight Testing. Expected completion in FY 95. (\$2,250)</p> <p>(U) <u>FY 1996 Planned Program:</u></p> <p>(U) - Continue effort to increase engine operability and supportability, reduce air aborts, aircraft safety incidents, non-mission capable rates, scheduled and unscheduled engine removals, maintenance man hours, and overall costs. (Total program \$103,700)</p> <p>(U) - Program will include approximately 7500 test hours (6300 sea level, 1200 altitude), to analyze, verify and qualify CIP tasks. (NSP)</p> <p>(U) - 620 CIP tasks (230 redesign tasks, 310 repair development tasks, 80 analysis tasks) generating \$2.6 Billion in LCC savings. (NSP)</p>		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE																																																						
BUDGET ACTIVITY		PE NUMBER AND TITLE																																																						
#7 - Operational Systems Development	#0604268F - Aircraft Engine Component Improvement Program (CIP)																																																							
<p>A. (U) <u>Mission Description and Budget Item Justification</u> (Cont'd)</p> <p>(U) <u>FY 1997 Planned Program:</u></p> <p>(U) - Continue effort to increase engine operability and supportability, reduce air aborts, aircraft safety incidents, non-mission capable rates, scheduled and unscheduled engine removals, maintenance man hours, and overall costs. (Total program \$105,600)</p> <p>(U) - To include approximately 600 CIP tasks and 7500 hours of testing (230 redesign tasks, 300 repair development tasks, 70 analysis tasks) generating \$2.6 Billion in Life Cycle Cost savings. (NSP)</p> <p>B. (U) <u>Program Change Summary (\$ in Thousands)</u></p> <table border="0"> <thead> <tr> <th></th> <th>FY94</th> <th>FY95</th> <th>FY96</th> <th>FY97</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Previous President's Budget</td> <td>102,704</td> <td>97,399</td> <td>98,589</td> <td>97,933</td> <td>CONT</td> </tr> <tr> <td>Appropriated Value</td> <td>102,704</td> <td>95,399</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Adjustments to Appropriated Value</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> a. Cong Gen reduction</td> <td>-2,631</td> <td>-1,043</td> <td></td> <td></td> <td></td> </tr> <tr> <td> b. BTR</td> <td>3,638</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> c. SBIR</td> <td>-1,169</td> <td>-1,792</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Adjustments to Budget Years Since FY95 PB</td> <td></td> <td></td> <td>5,111</td> <td>7,667</td> <td></td> </tr> <tr> <td>Current Budget Submit/President's Budget</td> <td>102,542</td> <td>92,564</td> <td>103,700</td> <td>105,600</td> <td>CONT</td> </tr> </tbody> </table> <p>Change Summary Explanation:</p> <p>Funding: The 1996 and 1997 PBs were increased to cover the Falcon 229 initiative. The remaining funds sustain known flight safety improvement tasks but decrease activity on some modifications that had been planned to reduce maintenance costs and improve reliability.</p> <p>Schedule: Lower priority tasks deferred to following year. The Engine Advisory Group assesses the program and budget annually and reviews progress regularly to reconcile budget reductions, shifting priorities and newly identified, urgent problems.</p> <p>Technical: No change.</p>				FY94	FY95	FY96	FY97	Total	Previous President's Budget	102,704	97,399	98,589	97,933	CONT	Appropriated Value	102,704	95,399				Adjustments to Appropriated Value						a. Cong Gen reduction	-2,631	-1,043				b. BTR	3,638					c. SBIR	-1,169	-1,792				Adjustments to Budget Years Since FY95 PB			5,111	7,667		Current Budget Submit/President's Budget	102,542	92,564	103,700	105,600	CONT
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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	
#7 - Operational Systems Development	#0604268F - Aircraft Engine Component Improvement Program (CIP)	
<p>C. (U) <u>Other Program Funding Summary (\$ in Thousands)</u>: Not applicable.</p> <p>(U) <u>RELATED ACTIVITIES</u>:</p> <p>(U) - PE # 0603202F, Aircraft Propulsion Subsystem Integration, provides fan and low pressure turbine technology</p> <p>(U) - PE # 0603216F, Advanced Turbine Engine Gas Generator, provides compressor, combustor, and high pressure turbine technology</p> <p>(U) - PE # 0604218F, Engine Model Derivative Program, provides additional component and engine test data</p> <p>(U) - PE # 0708011F, Industrial Preparedness Program, provides materials processing and component fabrication demonstration</p> <p>(U) - PEs # 0604268A and #0604268N, Army/Navy Aircraft Engine CIPs. These PEs will change to #0203752A and #0205633N in FY97.</p> <p>D. (U) <u>Schedule Profile</u></p> <p>Not applicable. CIP is an ongoing level-of-effort program.</p>		

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
#7 - Operational Systems Development	#0604268F - Aircraft Engine Component Improvement Program (CIP)		
<p>A. <u>Project Cost Breakdown (\$ in Thousands)</u></p> <p>Not applicable. CIP is a level-of-effort program that has been ongoing for forty years, now level funded at about \$100 million per year. There are hundreds of separate tasks executed each year from the list of candidates, but there are no separate Projects within the CIP program.</p>			
<p>B. <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u></p> <p>Not applicable.</p>			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

5 - Engineering And Manufacturing Development

0604270F EW Development

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	116,998	115,692	50,203	84,111	80,474	58,760	58,547	25,738	Continuing	TBD
1011 Joint Service Electronic Combat Systems Tester (JSECS)	1,012	3,508	7,837	11,566	9,990	0	0	0	0	33,913
2066 EF-111A Upgrade (SIP)	58,078	56,327	0	0	0	0	0	0	0	TBD
2272 ALE-47 Countermeasures Dispenser	2,343	0	0	0	0	0	0	0	0	0
2462 Compass Call (CC)	10,789	4,898	1,351	1,781	1,354	844	833	933	Continuing	TBD
3108 Airlift Defensive Systems (ADS)	188	190	0	0	0	0	0	0	0	0
3891 Advanced Infrared Countermeasures (AIRCIM)	0	0	41,015	70,764	69,130	57,916	57,714	24,805	TBD	TBD
3896 Advanced Strategic & Tactical Infrared Expendables (Aste)	8,056	11,461	0	0	0	0	0	0	0	0
4076 On-Board EW System (Obews)	14,002	17,108	0	0	0	0	0	0	0	0
4077 Advanced Missile Warning (AMW)	13,440	22,200	0	0	0	0	0	0	0	0
5618 F-15 Protective Systems	9,090	0	0	0	0	0	0	0	0	0

(U) A. Mission Description and Budget Item Justification

This program element (PE) consolidates engineering development efforts related to Air Force Electronic Warfare (EW) requirements. The EW Development Program objective is to transition advanced development technologies to installed operational capabilities via Engineering and Manufacturing Development (EMD) programs qualifying this as an RDT&E effort. The PE includes three projects (2272, 4076, and 5618) that have no RDT&E money beyond FY94. Project 2272, ALE-47 Countermeasures Dispenser System, project 5618, F-15 Protective Systems and project 3108, ADS completed their approved EMD programs and are in production. Funding was added to the FY95 PB for Project 4076, On-Board Electronic Warfare System. The EF-111A retires in FY97 and the EF-111A SIP has been canceled in FY96.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE
BUDGET ACTIVITY	PE NUMBER AND TITLE	February, 1995
5 - Engineering And Manufacturing Development		
(U) A. Mission Description and Budget Item Justification: (Continued)		
In addition, two other projects (3896-ASTE and 4077- AMW) are combined under project 3891, AIRCM Development, beginning in FY96. The components of infrared countermeasures are warning, tracking, and countermeasures. These components were combined because managing them as a total system is the most efficient and effective way to meet user requirements. This combined project (3891) is not a new start.		
(U) B. Program Change Summary (\$ in Thousands):		
(U) Previous President's Budget	FY 1994	Total
(U) Appropriated Value	143,433	Cost
(U) Adjustments to Appropriated Value	118,666	TBD
a. General Congressional Reduction	-1,191	
b. Below Threshold Reprogramming	+874	
c. SBIR	-1,351	
(U) Adjustments to Budget Years Since FY95 PB		
(U) Current Budget Submit/President's Budget	116,998	-69,558
		50,203
		-68,896
		84,111
(U) Change Summary Explanation (\$ in Thousands):		
FY94 Funding: (U) \$586 Undistributed reduction taken from projects 2272, 4076, and 5618. Other reductions described in project summaries.		
(U) Reprogramming actions described in project summaries.		
(U) Outyear funding reduced to fund higher priority Air Force requirements		
FY95 Funding: (U) \$3,553 Undistributed reduction and SBIR taken from project 4076.		
(U) Outyear funding reduced (EF-111A SIP) to fund higher priority Air Force requirements.		
Schedule: (U) See Project Summaries		
Technical: (U) See Project Summaries		
(U) C. Other Program Funding Summary (\$ in Thousands): See Project Summaries.		
(U) D. Schedule Profile: See Project Summaries.		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

5 - Engineering And Manufacturing Development

0604270F EW Development

1011

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
1011 Joint Service Electronic Combat Systems Tester (JSECST)	1,012	3,508	7,837	11,566	9,990	0	0	0	0	33,913

(U) A. Mission Description and Budget Item Justification

(U) The JSECST will fill both an Air Force and Navy operational requirement for a small, adaptable, and highly mobile tester capable of verifying the system level performance of installed electronic countermeasures systems. Present maintenance concepts rely on the built-in-test (BIT) capabilities of the line replaceable units (LRUs) to verify system performance. This method fails to detect failures in LRU interfaces and installed aircraft (Group A) hardware. Particular emphasis will be placed on size and weight since the test set must deploy with the operational unit.

(U) FY 1994

- (U) Initiate technical assessment and cost benefit analysis (CBA) of potential solutions (\$590)
- (U) Establish formal program cost estimates based on cost benefit analysis (\$222)
- (U) Prepare for EMD (\$200)

(U) FY 1995

- (U) Continue tech assessment/CBA (1600)
- (U) Finalize Operational Requirements Document (NSP)
- (U) Obtain MS II approval for EMD (NSP)
- (U) RFP Release (NSP)
- (U) Start O&M Test Requirements Document development (950)
- (U) SPO Support (958)
- (U) EMD Source Selection (NSP)

(U) FY 1996

- (U) Begin EMD efforts (6,370)
- (U) Begin Test Program Set Development (TPS) (500)
- (U) SPO Support (967)

(U) FY 1997

- (U) Continue EMD Contract (8,566)
- (U) Continue TPS development (2,500)
- (U) SPO Support (500)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)					DATE	February, 1995				
BUDGET ACTIVITY		PE NUMBER AND TITLE			PROJECT					
5 - Engineering And Manufacturing Development		0604270F EW Development			1011					
(U) B. <u>Program Change Summary (\$ in Thousands)</u>										
	FY 1994	FY 1995	FY 1996	FY 1997	Total Cost					
(U) Previous President's Budget	1,430	3,508	11,370	11,625	32,658					
(U) Appropriated Value	1,430									
(U) Adjustments to Appropriated Value	-17									
a. General Congressional Reduction	-385									
b. Below Threshold Reprogramming	-16									
c. SBIR										
(U) Adjustments to Budget Years Since FY95 PB			-3,533	-59						
(U) Current Budget Submit/President's Budget	1,012	3,508	7,837	11,566	33,913					
(U) Change Summary Explanation:										
Funding:										
Schedule: Program office Acquisition Strategy is being rephased . EMD contract will be awarded in 2QFY96, instead of 1QFY96.										
Technical: A technical assessment allowed program to proceed from Milestone 0 to Milestone II eliminating requirement for previously planned Dem/Val program.										
(U) C. <u>Other Program Funding Summary (\$ in Thousands)</u>										
	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	To Compl	Total Cost
(U) Aircraft Procurement, AF	0	0	0	0	0	12,424	13,621	14,034	14,715	54,794
(U) PE 27442F(Common ECM) In Service Direct Ground Support Equipment										

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

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BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

5 - Engineering And Manufacturing Development

0604270F EW Development

1011

(U) D. Schedule Profile

	FY 1994		FY 1995		FY 1996		FY 1997	
	1	2	3	4	1	2	3	4
(U) Draft ORD		X						
(U) Develop Acquisition Strategy								
(U) Prepare Draft RFP								
(U) Tech Assessment								
(U) Final ORD								
(U) MS II Approval								
(U) RFP Release								
(U) Source Selection								
(U) Contract Award								
(U) DT&E Start								

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)									
BUDGET ACTIVITY		PE NUMBER AND TITLE				DATE	PROJECT		
5 - Engineering And Manufacturing Development		0604270F EW Development					1011		
(U) A. <u>Project Cost Breakdown (\$ in Thousands)</u>									
		FY 1994	FY 1995	FY 1996	FY 1997				
(U) EMD Prep		200							
(U) Conduct Tech Assessment		590	1,600						
(U) Conduct cost estimate		222							
(U) EMD contract				6,370	8,566				
(U) TPS development				500	2,500				
(U) SPO support			1,958	967	500				
(U) Total		1,012	3,508	7,837	11,566				
(U) B. <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u>									
<u>Performing Organizations:</u>									
Contractor or	Contract								
Government	Method/Type								
Performing Activity	or Funding								
	Vehicle								
	Date								
	EAC								
	Office								
	Project								
	Total								
	Prior to								
	FY 1994								
	FY 1994								
	FY 1995								
	FY 1996								
	Budget to								
	Complete								
	Total								
<u>Product Development Organizations</u>									
Contractor(s)	TBD								
<u>Support and Management Organizations</u>									
ASC/LNA, NAVAIR,									
Wright Labs									
<u>Test and Evaluation Organizations</u>									
TBD									
<u>Government Furnished Property: Not applicable</u>									
TOTAL									

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February, 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
5 - Engineering And Manufacturing Development		0604270F EW Development								2462	
	COST (in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
2462	Compass Call (CC)	10,789	4,898	1,351	1,781	1,354	844	833	933	Continuing	TBD
<p>(U) A. <u>Mission Description and Budget Item Justification:</u> COMPASS CALL (CC) is an EC-130H developed for command and control warfare (C2W) as a stand-off jamming platform to disrupt enemy air defenses and ground operations. [INFORMATION DELETED]. It is optimally employed as part of an integrated electronic combat (EC) package as it complements both present and future air, ground, and sea based systems to provide theater commanders with a coordinated jamming platform. This program element provides a continuing technology program to keep the EC-130H current with the rapidly evolving threat.</p> <p>(U) Ongoing development programs are:</p> <p>(U) HBS (High Band System) - Integrates HBS countermeasures into system support facility for CC Block III upgrades. Contractor: MAGNA VOX, Ft Wayne, IN.</p> <p>(U) P-35 - [INFORMATION DELETED.]</p> <p>(U) HBE (High Band Exciter) - ECP to HBS, [INFORMATION DELETED]. Contractor: MAGNA VOX, Ft. Wayne, IN.</p> <p>(U) TRACS (Tactical Radio Acquisition and Countermeasures) - [INFORMATION DELETED]. Contractor: Lockheed-Sanders, Nashua, NH.</p> <p>(U) FY 1994</p> <ul style="list-style-type: none"> - (U) Continued development of HBE (5,385) - (U) Integrated HBS into system support facility (SSF) (1,361) - (U) Continued TRACS EMD (2,377) - (U) [INFORMATION DELETED] (NSP) - (U) Conducted ground proof-of-concept with AFFTC relating to future SAR program activities (NSP) - (U) Conducted SSF integration testing of digital acquisition receiver and interference cancellation subsystems (NSP) - (U) [INFORMATION DELETED] (NSP) - (U) Monitor MOA approval process (NSP) - (U) [INFORMATION DELETED] (NSP) - (U) [INFORMATION DELETED] (1,166) - (U) Began integration of upgrades into the test aircraft (NSP) - (U) Began new time and materials system support contract (500) - (U) Closed out low band DF subsystem EMD contract (NSP) 											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

0604270F EW Development

PROJECT

5 - Engineering And Manufacturing Development

2462

(U) A. Mission Description and Budget Item Justification: (Continued)(U) FY 1995

- (U) Complete integration of HBS into aircraft (2,878)
- (U) CONUS and OCONUS combined flight tests for HBS and JM/SA subsystems
- (U) Continue TRACS EMD (2,020)
- (U) [INFORMATION DELETED]
- (U) [INFORMATION DELETED]
- (U) Update MOA with SPM developing agency
- (U) [INFORMATION DELETED]

(U) FY 1996

- (U) Complete integration of Block 3 upgrades (HBS and JM/SA) on aircraft (1,249)
- (U) Conduct flight test of Block 3 upgrades
- (U) Correct test deficiencies
- (U) Complete users manuals/training
- (U) Continue TRACS EMD (102)

(U) FY 1997

- (U) Support IOT&E of Block 3 upgrades (1,000)
- (U) Continue TRACS EMD (170)
- (U) Develop counters to evolving threat (611)

(U) B. Program Change Summary (\$ in Thousands)

	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>	<u>Cost</u>
(U) Previous President's Budget	14,200	4,898	1,582	3,581	TBD
(U) Appropriated Value	11,213	4,898			
(U) Adjustments to Appropriated Value	-424				
a. General Congressional Reductions			-231	1,800	
(U) Adjustments to Budget Years Since FY95 PB			1,351	1,781	
(U) Current Budget Submit/President's Budget	10,789	4,898	1,351	1,781	TBD

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

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BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

5 - Engineering And Manufacturing Development

0604270F EW Development

2462

(U) B. Program Change Summary: (Continued)

(U) Change Summary Explanation:

(U) Funding: 95-97 reduced to fund higher priority Air Force requirements.

(U) Schedule:

(U) Technical: Sub programs that address programmable wideband jamming, digital acquisition, interference cancellation, and LPI countermeasures are no longer full Engineering and Manufacturing Development (EMD) programs but have been reduced to technology capture and risk reduction programs.

(U) C. Other Program Funding Summary (\$ in Thousands)

	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	To Compl	Total Cost
(U) Aircraft Procurement, AF										
(U) PE 27253F (Compass Call)	18,989	45,227	0	7,229	7,737	8,350	8,602	8,860	Cont.	N/A
(U) Modifications	14,093	8,469	8,158	5,626	5,869	6,333	6,524	6,722	Cont.	N/A
(U) Acft Replen Spares & Repairs	7,899	14,277	2,508	4,468	4,259	3,856	3,974	4,093	Cont.	N/A
(U) Acft Initial Spares & Repairs	24,728	4,010	8,026	6,371	11,242	0	0	0	0	N/A
(U) Other Charges	65,669	71,983	18,692	23,694	29,107	18,539	19,100	19,675	Cont.	N/A
(U) TOTAL										

(U) D. Schedule Profile

	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 1997
(U) BLOCK III System Integration	1	2	3	4	1	2	3	4	
(U) TRACS CDR	X*								
(U) TRACS ECP2 (Note 1)									
(U) P-35 ECP 3									
(U) HBE CDR (Note 2)									
(U) Block III CONUS Flight Test									
(U) BLOCK III OCONUS Flight Test									
(U) AFOTEC OT&E									
(U) 1st BLK III Delivery to ACC									

(U) Note 1: TRACS is a continuing program to keep the aircraft current with the evolving threat

(U) Note 2: Preplanned ECP to HBE program completes 2 Qtr FY98 (Additional frequency coverage using new generation amplifiers)

* = Start

** = Complete

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE			
5 - Engineering And Manufacturing Development		0604270F EW Development			2462
(U) A. Project Cost Breakdown (\$ in Thousands)					
	FY 1994	FY 1995	FY 1996	FY 1997	
(U) HBE/HBS	5,746	1,168	626	1,000	
(U) TRACS	2,377	2,020	102	170	
(U) P-35	1,166	500	258	0	
(U) ADCAT	200	0	0	0	
(U) CCMS Ops	990	930	0	0	
(U) Travel	100	60	50	50	
(U) Miscellaneous	210	220	315	561	
(U) Total	10,789	4,898	1,351	1,781	
(U) [NOTE: INFORMATION DELETED.] ADCAT funding was for contract closeout. CCMS operations funding completed a previous program.					
(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)					
Performing Organizations:					
Contractor or Government	Contract Method/Type	Award or Obligation Date	Performing Activity	Project Office	Total
Performing Activity	Vehicle		EAC	EAC	
Product Development Organizations					
Magnavox	SS/CPAF	2Q			17,354
GTE	SS/CPIF	2Q			7,669
Sanders	SS/CPIF	2Q			19,136
Support and Management Organizations					
MISC (SPO,Labs)	Various	1-4Q			
			1,618	1,100	367
			5,385	2,312	626
			1,166	1,186	258
			2,420	200	0
			1,170	Continuing	TBD
			0	0	10,279
			0	0	21,756
			511	Continuing	TBD
Test and Evaluation Organizations: Air Warfare Center conducts tests using its own funds.					

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)					DATE	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE				
5 - Engineering And Manufacturing Development		0604270F EW Development			2462	
(U) B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)						
Government Furnished Property:						
Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1994	Budget FY 1994	Budget to Complete Program
					FY 1994	FY 1997
				1,300	200	100
					100	Continuing
					100	Continuing
					100	Continuing
					100	Continuing
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Exhibit R-3

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February, 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT		
5 - Engineering And Manufacturing Development		0604270F EW Development								3891		
COST (In Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
3891	Advanced Infrared Countermeasures (AIRCМ)	0	0	41,015	70,764	69,130	57,916	57,714	24,805	TBD	TBD	
<p>(U) A. <u>Mission Description and Budget Item Justification</u></p> <p>The operating commands require AIRCM to increase aircraft survivability against threats increasing in numbers and capability. The synergistic use of AIRCM (missile warning, expendables, dispensers, and directable countermeasures (DC)) offers the most protection. This project focuses on developing an AIRCM suite that can be tailored and integrated into current generation combat, airlift and special operations aircraft. Without the AIRCM suite, survivability of current generation aircraft will decrease due to proliferation of and improvements in threat missile systems (i.e., advanced electro-optics, infrared and radio frequency missile seekers). The AIRCM project has two principal thrusts: 1) providing advanced missile warning (AMW) and advanced expendable (ADVEX) capabilities to combat attack aircraft (with growth to DC); and 2) developing and integrating a directable Infrared Countermeasures (IRCM) system on airlift and special operations aircraft. The subsystems are being developed in an integrated fashion to optimize the performance of the whole suite, versus each part. The program plan maximizes commonality across Air Force aircraft and is a joint effort as well. We are finalizing a common Operational Requirements Document with the Navy for AMW for fighters, and with both the Army and Navy for ADVEX. Demonstration and Validation (Dem/Val) of DC concepts is planned to prove directed/focused infrared energy is an effective countermeasure for large aircraft. Both the AMW and ADVEX portions of the AIRCM suite are preparing to enter EMD. ADVEXs will be functionally compatible with existing dispenser systems. Internal AMW installation is planned for the F-16 and F-15 aircraft. A pod mechanization system is also a candidate for AMW installation on the A/OA-10 and any other aircraft capable of carrying an electronic attack pod.</p>												
<p>(U) FY 1994 The following figures reflect activities associated with projects previously reported as 3108 with 3896 and 4077 continuing in this project.</p> <ul style="list-style-type: none"> - (U) Project 3108 - (U) Evaluate requirements for AAR-47 changes (168) - (U) Continue definition of needs for AIRCM (20) 												

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	PROJECT
BUDGET ACTIVITY	PE NUMBER AND TITLE		
5 - Engineering And Manufacturing Development	0604270F EW Development		3891
(U) A. <u>Mission Description and Budget Item Justification:</u> (Continued)			
- (U) Project 3896			
- (U) Completed live fire missile tests against advanced Infrared (IR) decoys (150)			
- (U) Complete assessment of IR decoy requirements for each identified user platform (500)			
- (U) Initiate in-house development efforts with Naval Surface Warfare Center - Crane Division (900)			
- (U) Milestone II preparation (500)			
- (U) Conduct ASTE unique range improvements for DT&E (1,800)			
- (U) Continue engagement modeling and analysis in support of EMD (2,606)			
- (U) Add missile warning, jammers, and new threats to IR modeling system (1,600)			
- (U) Project 4077			
- (U) IDAL support (1,200)			
- (U) Contractor support (China Lake NAWC) (200)			
- (U) Scheduling & Configuration/Data management (150)			
- (U) Flight Demonstration (750)			
- (U) Internal feasibility studies (Navy/Marine Corps) (2,200)			
- (U) System threat assessment (30)			
- (U) ALQ-131 pod demonstration (50)			
- (U) Logistics support (100)			
- (U) Internal feasibility studies (Air Force Platforms) (3,000)			
- (U) Navy COEA support (375)			
- (U) MOSAIC modeling & simulation (2,800)			
- (U) MFQ/QA support (25)			
- (U) Miscellaneous program efforts (755)			
- (U) System engineering support (700)			
- (U) ECAC project & ECO (150)			
- (U) Testing support DT&E (50)			
- (U) Information systems integration and planning (125)			
- (U) Advanced Threat Infrared Countermeasures (ATIRCM)/AMWS independent review (100)			
- (U) Integrated Program Documentation products (180)			
- (U) Mission support (500)			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	PROJECT
BUDGET ACTIVITY	PE NUMBER AND TITLE		
5 - Engineering And Manufacturing Development	0604270F EW Development	February, 1995	3891
(U) A. <u>Mission Description and Budget Item Justification:</u> (Continued)			
(U) FY 1995 The following figures reflect activities associated with projects previously reported as 3108 with 3896 and 4077 continuing in this project.			
- (U) Project 3108			
- (U) Completion of test and evaluation of the AAR-47 improvements program and ALE-47 on aircraft. (190)			
- (U) Project 3896			
- (U) Continue in-house development efforts with Naval Surface Warfare Center - Crane Division (1200)			
- (U) Award and execute EMD contract(s) for advanced decoy development (4500)			
- (U) Conduct early ground and safety of flight testing (1100)			
- (U) Initiate production planning for advanced IR decoys (500)			
- (U) Complete DT&E test planning (500)			
- (U) Continue engagement modeling and analysis in support of EMD (1161)			
- (U) Continue improvement of IR engagement modeling system (500)			
- (U) Fabricate assets for and initiate DT&E testing of advanced decoys (2000)			
- (U) Project 4077			
- (U) Advanced Missile Approach Warning System (Group B) EMD Contract (8,400)			
- (U) False alarm/ missile plume characterization (1,400)			
- (U) F-15 aircraft (Group A) EMD integration (2,000)			
- (U) F-16 aircraft (Group A) EMD integration (3,600)			
- (U) A-10 aircraft (Group A) EMD integration (1,000)			
- (U) Pods (Group A) EMD integration (3,300)			
- (U) Mission and Program Support (2,500)			
(U) FY 1996			
- (U) Major Contracts (29,120)			
- (U) Support Contracts (1,832)			
- (U) In-House Contracts (8,071)			
- (U) GFE/Other (1,992)			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

5 - Engineering And Manufacturing Development

0604270F EW Development

3891

(U) A. Mission Description and Budget Item Justification: (Continued)

(U) FY 1997

- (U) Major Contracts (35,338)
- (U) Support Contracts (3,390)
- (U) In-House Contracts (26,664)
- (U) GFE/Other (5,372)

(U) B. Program Change Summary (\$ in Thousands)

	FY 1994*	FY 1995*	FY 1996	FY 1997	Total Cost
(U) Previous President's Budget	25,230	30,441	0	0	TBD
(U) Appropriated Value	22,324	33,881			
(U) Adjustments to Appropriated Value					
a. General Congressional Reductions	200				
b. Below Threshold Reprogramming	441	-30			
(U) Current Budget Submit/President's Budget	21,683	33,851	41,015	70,764	TBD
* Reflects funding for projects 3108,3896, and 4077.					

(U) Change Summary Explanation:

Funding: Projects 3896 and 4077 combined into this project beginning in FY96.

Schedule: Based on a thorough schedule risk assessment and direction to combine AF/Naval efforts into a joint program (AF lead), EMD schedule rebaselined from 36 to 50 month program.

Technical: None.

(U) C. Other Program Funding Summary (\$ in Thousands)

	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	To Compl	Total Cost
(U) Aircraft Procurement, AF	0	0	0	0	46,281	83,530	120,857	TBD	TBD
(U) PE 27442F (Missile Warning only)									
(U) Modifications									

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE		February, 1995		PROJECT			
BUDGET ACTIVITY										PE NUMBER AND TITLE						3891	
5 - Engineering And Manufacturing Development										0604270F EW Development							
(U) D. <u>Schedule Profile</u>																	
(U) Project 3108, ADS																	
(U) Qualification OT&E																	
(U) Project 3896, ASTE																	
(U) Tactical Roundtable																	
(U) Acquisition Strategy Panel																	
(U) RFP Release																	
(U) MS II Decision																	
(U) EMD Contract Award																	
(U) Project 4077, AMW																	
(U) Pod Demos																	
(U) Internal Demos																	
(U) Acquisition Strategy Panel																	
(U) MS II Decision																	
(U) EMD Contract Award																	
(U) System Design Review																	
(U) Project 3891, AIRCM																	
(U) ADVEX PDR																	
(U) ADVEX CDR																	
(U) ADVEX DT&E																	
(U) AMW PDR																	
(U) AMW CDR																	
(U) AMW Qual Test																	
(U) ADVEX FCA																	
(U) ADVEX Fab OT&E Units																	
(U) ADVEX OT&E Start																	
(U) AMW Platform Integration																	
(U) AMW DT&E Preparation																	
* = Start														** = Complete			

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Exhibit B-2

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Exhibit R-2

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

5 - Engineering And Manufacturing Development

0604270F EW Development

3891

(U) A. Project Cost Breakdown (\$ in Thousands)

	FY 1994*	FY 1995*	FY 1996	FY 1997
(U) Project 4077/3891				
(U) AMW Group B		9,400	12,100	8,500
(U) AMW Group A		8,000	16,500	39,000
(U) AMW Integration	5,700		7,100	13,600
(U) AMW System Eng/Program Mgt	6,790	4,310	1,300	1,500
(U) AMW System T&E	950		100	600
(U) AMW Other Gov Costs		490	1,218	2,464
(U) Project 3896/3891				
(U) ADVEX Prime Mission Product				
(U) Special Material Decoys		900		600
(U) Advanced Kinematic Decoys		3,500		1,700
(U) ADVEX Other Gov. Dev. effort	900			
(U) ADVEX System Eng/Program Mgt	3,000		200	
(U) ADVEX Eng. Change Orders	700			700
(U) ADVEX System Test & Eval		700	1,697	1,700
(U) ADVEX Mission Support	2,200	600	800	400
(U) ADVEX Dem/Val tasks	1,255			
(U) Project 3108				
(U) Testing		190		
(U) System Engineering	188			
(U) Total	21,683	33,851	41,015	70,764

* Project 4077, 3896 and 3108.

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)						DATE	February, 1995	PROJECT	
BUDGET ACTIVITY		PE NUMBER AND TITLE						3891	
5 - Engineering And Manufacturing Development		0604270F EW Development							
(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)									
Performing Organizations:									
Contractor or Government Performing Activity	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1994	Budget FY 1994	Budget FY 1995	Budget FY 1996	Budget FY 1997 Complete	Total Program
Product Development Organizations									
Prime Contractor(s) is(are) TBD				22,785		14,900	13,100	8,500	TBD
Integration contractor (Airframe contractors)					5,700	9,900	22,882	52,600	TBD
Support and Management Organizations									
ASC/LN, TEMS, Wright Labs, Naval Surface Warfare Center				2,785	15,983	7,951	3,236	7,364	TBD
Test and Evaluation Organizations									
TBD (AFOTEC or Navy test organization)				12,501		1,100	1,797	2,300	TBD
TOTAL				38,071	21,683	33,851	41,015	70,764	TBD
Government Furnished Property: Not Applicable.									
								TBD	
								TBD	

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

5 - Engineering And Manufacturing Development

0604321F Combat Intelligence System

2758

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
2758 Combat Intelligence System	5,630	8,315	3,938	2,035	1,678	1,042	1,073	1,105	Continuing	TBD

(U) Note: FY94 Actuals include \$3,565 from PE 0207431F to reflect true program funding. This program element will not be submitting a descriptive summary. Starting in FY96, RDT&E funds move from 0207431F to 0604321F.

(U) **A. Mission Description and Budget Item Justification**

(U) Combat Intelligence System (CIS) will be the single, standard Air Force intelligence system to optimize both component and unit-level intelligence functions to provide warfighters with the most accurate and timely intelligence data available. CIS will be the core capability for automating the receipt, correlation, and dissemination of intelligence information to a variety of intelligence and operational systems supporting combat planning and execution. CIS will be able to build and maintain in-theater situational awareness while deploying to the theater and provides indications and warning (I&W) support upon arrival. CIS provides the capability to receive all source intelligence near-real-time from national, theater, tactical reconnaissance, and intelligence functions. CIS is electronically interoperable and compatible with other intelligence systems to provide an integrated system capable of intelligence support to operational users while providing multi-source electronic countermeasures systems and radar warning receivers. The category of research being performed in this program element is Engineering and Manufacturing Development.

(U) Acquisition Approach: Full and open competition leading to a cost plus award fee contract.

(U) FY 1994

- (U) Initiated developing SCI level correlation capability. (\$1,050)
- (U) Initiated integrating CIS with upgrades including imagery storage, imagery exploitation, target support, and security level message handling. (\$4,350)
- (U) Initiated developing a single interface to CIS applications for a common data source. (\$230)

(U) FY 1995 (See note on page 1)

- (U) Implement SCI level correlation capability and begin to enhance capability. (\$1,514)
- (U) Continue integrating upgrades to CIS including mapping, imagery, multimedia, and air/ground situations. (\$4,812)
- (U) Begin CIS software development under TBM (Theater Battle Management) Core Systems. (\$1,989)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

5 - Engineering And Manufacturing Development

0604321F Combat Intelligence System

2758

(U) FY 1996

- (U) Complete SCI level correlation enhancements. (\$633)
- (U) Continue CIS software development under TBM Core Systems to include targeting, damage assessment, and mission reporting. (\$2,972)
- (U) Conduct studies for future CIS intelligence interoperability with Global Command and Control System. (\$333)

(U) FY 1997

- (U) Continue software development under TBM Core Systems. (\$1,473)
- (U) Implement results of studies into CIS software under TBM Core Systems. (\$450)
- (U) Continue studies for CIS intelligence interoperability. (\$112)

(U) B. Program Change Summary (\$ in Thousands)

	FY 1994	FY 1995	FY 1996	FY 1997	Total Cost TBD
(U) Previous President's Budget	5,686	8,666	3,958	2,045	
(U) Appropriated Value	5,686	8,666			
(U) Adjustments to Appropriated Value					
a. General Congressional Reductions	-32	-190			
b. Below Threshold Reprogramming	-24	-161			
c. SBIR					
(U) Adjustments to Budget Years Since FY95 PB			-20	-10	
(U) Current Budget Submit/President's Budget	5,630	8,315	3,938	2,035	TBD

(U) Change Summary Explanation:

Funding: Starting in FY95, RDT&E funds move from 0207431F to 0604321F. FY94 Actuals include \$2,065 from PE 0604321F and \$3,565 from PE 0207431F. 0207431F is not submitting a RDT&E Descriptive Summary.

Schedule:

Technical:

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Exhibit R-2

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	February, 1995	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE				
5 - Engineering And Manufacturing Development		0604321F Combat Intelligence System				
(U) A. <u>Project Cost Breakdown (\$ in Thousands)</u>						
		FY 1994	FY 1995	FY 1996	FY 1997	
(U) Software Development		2,456	5,425	2,818	1,183	
(U) Test and Evaluation		87	143	125	110	
(U) Program Management Support		1,224	968	330	275	
(U) Travel		175	242	175	125	
(U) Government Engineering Support		275	203	276	215	
(U) System Engineering Support		1,052	743	214	127	
(U) Miscellaneous		254	329			
(U) PBD Reductions		107	262			
(U) Total		5,630	8,315	3,938	2,035	

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)						DATE	PROJECT					
BUDGET ACTIVITY		PE NUMBER AND TITLE										
5 - Engineering And Manufacturing Development		0604321F Combat Intelligence System					2758					
(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)												
Performing Organizations:												
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1994	Budget FY 1994	Budget FY 1995	Budget FY 1996	Budget FY 1997	Budget to Complete	Total Program	
<u>Product Development Organizations</u>												
BTG, Inc												
F19628-92-D0005	SS/CPAF	Sep 92	3,154	3,154		1,008	1,513	633			3,154	
CIS Software Dev	TBD	TBD	TBD	TBD		2,259	4,948	2,636	1,523	Cont	TBD	
<u>Support and Management Organizations</u>												
Ongoing						1,052	743	214	127	Cont	TBD	
TEMS- Ongoing						1,224	968	330	275	Cont	TBD	
Various Contractors												
<u>Test and Evaluation Organizations</u>												
Test Support	Ongoing					87	143	125	110	Cont	TBD	
Government Furnished Property: Not Applicable												
Subtotal Product Development												TBD
Subtotal Support and Management												TBD
Subtotal Test and Evaluation												TBD
Total Project												TBD

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Exhibit R-3

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February, 1995	
BUDGET ACTIVITY				PE NUMBER AND TITLE									
5 - Engineering And Manufacturing Development				0604441F Space Based InfraRed System High Element EMD									
COST (In Thousands)				FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost				0	112,981	152,219	198,982	350,213	566,098	661,490	698,109	Continuing	Continuing
3616 SBIRS High Element EMD				0	84,681	142,819	198,982	350,213	566,098	661,490	698,109	Continuing	Continuing
0002 Miniature Sensor Technology Integration (MSTI)*				0	28,300	9,400	0	0	0	0	0	0	37,700

*NOTE: FY95 funding for Project 0002 (MSTI) includes a planned reprogramming of \$13,000,000 from PE #603402F to this Program Element.

(U) A. Mission Description and Budget Item Justification

(U) The purpose of the Space Based InfraRed System (SBIRS) program is to develop a system which provides increased performance over the existing Defense Support Program (DSP) system. The system's primary mission is to provide initial warning of a ballistic missile attack on the continental US, its deployed forces and allies. SBIRS will incorporate new technologies that would enhance detection, provide direct reporting of ICBM/SLBM and tactical ballistic missile launches, and provide critical mid-course tracking and discrimination data for national and theater missile defense. The integrated system architecture consists of sensors located in Geosynchronous Orbits (GEO), Highly Elliptical Orbits (HEO) and Low Earth Orbits (LEO) and an integrated, centralized ground station serving all space elements of the SBIRS System, as well as DSP. This Program Element funds SBIRS Engineering and Manufacturing Development (EMD) activities, and is therefore assigned to Budget Activity Research Category Engineering and Manufacturing Development. Funding is also provided in FY95 and FY96 for the Miniature Sensor Technology Integration (MSTI) program. Funding for the SBIRS program is also provided by PE #603441F and PE #305915F.

(U) Acquisition Strategy:

(U) The SBIRS program is a lead program for acquisition streamlining. Program documentation has been consolidated into a single document, the Single Acquisition and Management Plan (SAMP). The pre-EMD contract will be competed in a full and open competition. Two contracts will be awarded for the pre-EMD phase, and a downselect to a single contractor is planned for the EMD phase.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

5 - Engineering And Manufacturing Development

0604441F Space Based InfraRed System High Element EMD

(U) B. Program Change Summary (\$ in Thousands)

	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>	<u>Total Cost</u>
(U) Previous President's Budget		111,000	153,000	200,000	Continuing
(U) Appropriated Value		104,000			
(U) Adjustments to Appropriated Value					
a. Cong Gen Reductions		- 1,864			
b. SBIR		- 2,155			
c. Omnibus or Other Above Threshold Reprogram		+ 13,000			
d. Below Threshold Reprogramming			-781		
(U) Adjustments to Budget Years Since FY95 PB				-1,018	
(U) Current Budget Submit/President's Budget		112,981	152,219	198,982	Continuing

(U) Change Summary Explanation:

Funding: FY95 Above Threshold Reprogramming reflects a planned reprogramming of \$13,000,000 from PE #603402F to this Program Element for the MSTI program. This reprogramming realigns funds which were added by Congress for MSTI to the appropriate program element. Adjustments to Budget Years Since FY95 PB reflect a decrease (\$781,000 in FY96, \$1,018,000 in FY97) due to inflation changes.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. Other Program Funding Summary (\$ in Thousands)

	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	To Complete	Total Cost
(U) Other Procurement			19,895	23,877	0	20,887	6,363	8,954	Continuing	Continuing
(U) Operations & Maintenance					16,949	15,952	16,947	16,945	Continuing	Continuing
Related RDT&E:										
(U) PE #603441F - Space Based InfraRed System - Dem/Val										
(U) PE #305911F - Defense Support Program (DSP)										
(U) PE #603216C - TALON SHIELD (BMDO Advanced Development)										

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE _____

February, 1995

BUDGET ACTIVITY

5 - Engineering And Manufacturing Development

PE NUMBER AND TITLE

0604441F Space Based InfraRed System High
Element EMD

(U) D. Schedule Profile

	FY 1994	FY 1995	FY 1996	FY 1997
	1	2	3	4
(U) DRB Architecture Approval				
(U) DAE Program Review				
(U) RFP Release		X		
(U) Pre-EMD Contract Award				
(U) System Requirements Review				
(U) System Functional Review				
(U) DAE Program Review				
(U) EMD Authority To Proceed (ATP)				
(U) Other Events Beyond Budget Years				
(U) PDR (SBIR Consolidated Ground)				
(U) PDR (HIGH Space Segment)				
(U) Consolidated Grnd IOC for DSP				
(U) Consolidated Grnd IOC for HIGH				
(U) First Satellite Delivery				
(U) First GEO Launch				
(U) First HEO Launch				

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

5 - Engineering And Manufacturing Development

PE NUMBER AND TITLE

0604441F Space Based InfraRed System High
Element EMD

PROJECT

3616

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
3616 SBIRS High Element EMD	0	84,681	142,819	198,982	350,213	566,098	661,490	698,109	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) The purpose of the Space Based InfraRed System (SBIRS) program is to develop a system which provides increased performance over the existing Defense Support Program (DSP) system. The system's primary mission is to provide initial warning of a ballistic missile attack on the continental US, its deployed forces and allies. SBIRS will incorporate new technologies that would enhance detection, provide direct reporting of ICBM/SLBM and tactical ballistic missile launches, and provide critical mid-course tracking and discrimination data for national and theater missile defense. The integrated system architecture consists of sensors located in Geosynchronous Orbits (GEO), Highly Elliptical Orbits (HEO) and Low Earth Orbits (LEO) and an integrated, centralized ground station serving all space elements of the SBIRS System, as well as DSP. This Program Element funds SBIRS Engineering and Manufacturing Development (EMD) activities. Funding for the SBIRS program is also provided by PE #603441F and PE #305915F.

(U) FY 1994

- (U) Request For Proposals (RFP) Development (\$0)
- (U) Operational Requirements Document (ORD) Development (\$0)

(U) FY 1995

- (U) Award Pre-EMD contracts for Space and Ground segment development (\$44,300)
- (U) Begin Space Based InfraRed technology and phenomenology projects (\$12,400)
- (U) Defense Acquisition Executive (DAE) Program Review (Feb 95)
- (U) Continue Program Office activities (\$17,981)
- (U) RFP Release for Pre-EMD phase (Mar 95)
- (U) Contract Award (Jun 95)
- (U) Continue Cobra Brass Project (\$10,000)

(U) FY 1996

- (U) Continue Pre-EMD contracts for Space and Ground segment Development (\$96,700)
- (U) Continue Space Based InfraRed technology and phenomenology projects (\$23,900)
- (U) DAE Program Review (Jun 96) for EMD Phase

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	PROJECT
BUDGET ACTIVITY	PE NUMBER AND TITLE		
5 - Engineering And Manufacturing Development	0604441F Space Based InfraRed System High Element EMD	February, 1995	3616
<ul style="list-style-type: none"> - (U) Continue Program Office activities (\$22,219) - (U) Source Selection for down-select for EMD Phase (Jun 96) 			
(U) FY 1997			
<ul style="list-style-type: none"> - (U) Initiate EMD contracts for Space and Ground segment Development (\$157,982) - (U) Continue Program Office activities (\$24,000) - (U) Continue Space Based InfraRed technology and phenomenology projects (\$17,000) 			
(U) B. Program Change Summary (\$ in Thousands)			
(U) Previous President's Budget	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>
(U) Appropriated Value		111,000	153,000
(U) Adjustments to Appropriated Value		104,000	200,000
<ul style="list-style-type: none"> a. Cong Gen Reductions b. SBIR c. Omnibus or Other Above Threshold Reprogram d. Below Threshold Reprogramming 		- 1,864	
		- 2,155	
		- 15,300	
(U) Adjustments to Budget Years Since FY95 PB			
(U) Current Budget Submit/President's Budget		84,681	- 1,018
			198,982
			Continuing
(U) Change Summary Explanation:			
Funding: FY95 Above Threshold Reprogramming reflects realignment of \$15,300,000 from this project to project 0002. Adjustments to Budget Years Since FY95 PB reflect a decrease (\$781,000 in FY96, \$1,018,000 in FY97) due to inflation changes, and a decrease in FY96 (\$9,400,000) for realignment to Project 0002 (MSTI).			
Schedule: Not Applicable.			
Technical: Not Applicable.			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

5 - Engineering And Manufacturing Development

0604441F Space Based InfraRed System High

3616

Element EMD

(U) C. Other Program Funding Summary (\$ in Thousands)

	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	To Complete Continuing	Total Cost Continuing
(U) Other Procurement			19,895	23,877	0	20,887	6,363	8,954		
(U) Operations & Maintenance					16,949	15,952	16,947	16,945		

(U) D. Schedule Profile

	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	To Complete Continuing	Total Cost Continuing
(U) DRB Architecture Approval	1	2	3							
(U) DAE Program Review										
(U) RFP Release				X						
(U) Pre-EMD Contract Award										
(U) System Requirements Review										
(U) System Functional Review										
(U) DAE Program Review										
(U) EMD Authority To Proceed (ATP)										
(U) Other Events Beyond Budget Years										
(U) PDR (SBIR Consolidated Ground)										
(U) PDR (HIGH Space Segment)										
(U) Consolidated Grnd IOC for DSP										
(U) Consolidated Grnd IOC for HIGH										
(U) First Satellite Delivery										
(U) First GEO Launch										
(U) First HEO Launch										

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Exhibit R-2

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)									
BUDGET ACTIVITY			PE NUMBER AND TITLE				DATE		
5 - Engineering And Manufacturing Development			0604441F Space Based InfraRed System High Element EMD				February, 1995		
							PROJECT		
							3616		
(U) A. <u>Project Cost Breakdown (\$ in Thousands)</u>									

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

5 - Engineering And Manufacturing Development

0604441F Space Based InfraRed System High

PROJECT

3616

Element EMD

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1994	Budget FY 1994	Budget FY 1995	Budget FY 1996	Budget FY 1997	Budget to Complete	Total Program
Support and Management Organizations											
Aerospace Corp	MORD	Sep 95			0	0	7,600	11,200	12,000	Cont	TBD
Prgm Mgmt Supt	Various	Sep 95			0	0	10,381	11,019	12,000	Cont	TBD
Test and Evaluation Organizations											
Not Applicable.											
(U) B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)											
Government Furnished Property: Not Applicable.											
Subtotal Product Development											
Subtotal Support and Management											
Subtotal Test and Evaluation											
Total Project											

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Exhibit R-3

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

February, 1995

PE NUMBER AND TITLE

0604441F Space Based InfraRed System High

0002

Funding: FY95 Above Threshold Reprogramming reflects realignment of \$15,300,000 to this project from Project 3616. Adjustments to Budget Years Since FY95 PB reflect an increase in FY96 of \$9,400,000 from Project 3616. In addition, \$13,000,000 was appropriated for MSTI in FY95, and is being realigned from PE #603402F to this PE.

Technical: Not Applicable.

(U) D. Schedule Profile

	FY 1997	3
	2	

(U) On-orbit Operations

X
X
X
X

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

February, 1995

PE NUMBER AND TITLE

0604441F Space Based InfraRed System High

0002

(U) A. Project Cost Breakdown (\$ in Thousands)							
		<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>		
(U) MSTI Spacecraft			14,780				
(U) Launch			4,950				
(U) On-orbit Ops and Support			8,570	9,400			
(U) Total			28,300	9,400			
(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)							
Performing Organizations:							
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1994	Budget FY 1994	Budget FY 1995
						Budget FY 1996	Budget FY 1997
						Budget to Complete	Total Program
Product Development Organizations	TBD	Sep 95	37,700	37,700	0	0	28,300
TBD						9,400	37,700
Support and Management Organizations							
Not Applicable.							
Test and Evaluation Organizations							
Not Applicable.							

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

5 - Engineering And Manufacturing Development

0604441F Space Based InfraRed System High

Element EMD

PROJECT

0002

(U) B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)

Government Furnished Property:
Not Applicable.

Contractor or

Government

Performing

Activity

Subtotal Product Development

Subtotal Support and Management

Subtotal Test and Evaluation

Total Project

Award or

Obligation

Date

Performing

Activity

EAC

Project

Office

EAC

Total

Prior to

FY 1994BudgetFY 1994BudgetFY 1995BudgetFY 1996BudgetFY 1997Budget toCompleteTotalProgram

37,700

37,700

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February, 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
5 - Engineering and Manufacturing Development		0604479F Milstar LDR/MDR Satellite Communications								5010	
COST (in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
5010 MILSTAR Sat Comm Sys	828,375*	585,491	649,666	744,990	703,412	631,762	383,764	142,704	335,000	9,978,164	
* The FY94 actuals reflect the actuals for the Space and Mission Control segments only. Funding was budgeted and appropriated in PE #303601F.											
(U) A. <u>Mission Description and Budget Item Justification</u>											
Milstar is a joint service program to develop and acquire extremely high frequency (EHF) satellites, satellite mission control segment, and new or modified Army, Navy, and Air Force communication terminals for survivable, jam-resistant, world-wide, secure communications for the strategic and tactical warfighter in all levels of conflict. This descriptive summary addresses the space and mission control segments of the Milstar program. This program is in research category 5, Engineering, Manufacturing, and Development, based on Defense Acquisition Board and Defense Planning Guidance direction to fabricate and launch Satellites 3M through 6.											
(U) FY 1994											
- (U) Milstar I (\$267,975)											
- (U) Removed Satellite 1 from storage and shipped to launch base.											
- (U) Integrated Satellite 1 to launch vehicle and completed pre-launch checkout.											
- (U) Launched Satellite 1 and performed on-orbit checkout.											
- (U) Started and completed satellite 1 Developmental Test and Evaluation (DT&E).											
- (U) Started Phase I Initial Operational Test and Evaluation (IOT&E).											
- (U) Implemented engineering change proposals (ECPs).											
- (U) Developed and implemented modifications to Mission Control Element (MCE) to support multi-satellite mission control operations.											
- (U) Continued contractor support for MCS software sustainment for mission planning and satellite operations.											
- (U) Milstar II (\$467,600)											
- (U) Awarded Satellite 3M Supplemental Agreement on Milstar II contract.											
- (U) Continued Milstar II EMD'; complete MDR payload critical design review (CDR).											
- (U) Continued MDR payload manufacturing on Satellite 3M.											
- (U) Continued bus component manufacturing on Satellites 3M and 4.											
- (U) Completed LDR payload manufacturing on Satellite 3M.											
- (U) Continued LDR payload manufacturing on Satellite 4.											
- (U) Started LDR integration and test on Satellite 3M.											
- (U) Other Government Costs (\$92,800)											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	PROJECT NO.
BUDGET ACTIVITY	PE NUMBER AND TITLE		
5 - Engineering and Manufacturing Development	0604479F Milstar LDR/MDR Satellite Communications	February 1995	5010
<p>(U) <u>FY 1995</u></p> <ul style="list-style-type: none"> - (U) Milstar I (\$115,600) <ul style="list-style-type: none"> - (U) Completed Milstar I Phase I IOT&E Dedicated Asset Test (DAT). - (U) Delivered Satellite 2 and placed in storage. - (U) Launch and perform on-orbit checkout of Satellite 2. - (U) Complete Milstar I Phase I IOT&E. - (U) Implement ECPs as needed based on operational requirement. - (U) Transition from MCE to Satellite Mission Control Subsystem (SMCS). - (U) Continue contractor support for MCS software sustainment for mission planning and satellite operations. - (U) Develop and field operator training equipment. - (U) Milstar II (\$390,440) <ul style="list-style-type: none"> - (U) Continue MDR payload manufacturing for Satellites 3M. - (U) Complete bus component manufacturing for Satellite 3M. - (U) Complete MDR System CDR. - (U) Continue bus component manufacturing for Satellite 4. - (U) Continue LDR integration and test for Satellite 3M. - (U) Continue LDR payload manufacturing on Satellite 4. - (U) Awarded contract to start acquisition of Satellites 5 and 6. - (U) Procure parts and start fabrication for Satellites 5 and 6. - (U) Start Milstar II upgrade of MCS software for mission planning. - (U) Other Government Costs (\$79,451) <p>(U) <u>FY 1996</u></p> <ul style="list-style-type: none"> - (U) Milstar I (\$89,100) <ul style="list-style-type: none"> - (U) Continue to support on-orbit operations for Satellites 1 and 2. - (U) Start and complete Milstar I Phase II IOT&E - (U) Implement ECPs as needed based on operational requirement. - (U) Develop and implement modifications to SMCS to enhance mission control operations. - (U) Continue contractor support for MCS software sustainment for mission planning and satellite operations. 			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	PROJECT NO.
BUDGET ACTIVITY	PE NUMBER AND TITLE		
5 - Engineering and Manufacturing Development	0604479F Milstar LDR/MDR Satellite Communications	February 1995	5010
<ul style="list-style-type: none"> - (U) Milstar II (\$497,366) - (U) Complete MDR payload manufacturing on Satellite 3M, and start MDR integration and test on Satellite 3M. - (U) Start MDR payload manufacturing for Satellites 4. - (U) Start and complete bus integration and test for Satellite 3M. - (U) Continue bus component manufacturing for Satellites 4. - (U) Complete LDR integration and test on Satellite 3M, and start LDR integration and test on Satellite 4. - (U) Complete LDR payload manufacturing on Satellite 4. - (U) Continue to procure parts and build Satellites 5 and 6. - (U) Continue Milstar II upgrade of MCS software for mission planning - (U) Other Government Costs (\$63,200) 			
(U) FY 1997			
<ul style="list-style-type: none"> - (U) Milstar I (\$68,700) - (U) Continue to support on-orbit operations for Satellites 1 and 2. - (U) Implement ECPs as needed based on operational requirement. - (U) Continue to implement modifications to MCS to enhance mission control operations. - (U) Transition to organic support for MCS software sustainment for mission planning and satellite operations. - (U) Milstar II (\$610,592) - (U) Complete MDR payload manufacturing on Satellite 4, and start MDR integration and test on Satellite 4. - (U) Complete bus component manufacturing on Satellite 4 and start bus integration and test on Satellite 4. - (U) Continue LDR integration and test on Satellite 4. - (U) Continue component/subsystem fabrication of satellites 5 and 6. - (U) Start Satellite integration and test on Satellite 3M. - (U) Continue Milstar II upgrade of MCS software for mission planning - (U) Other Government Costs (\$65,698) 			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE		PROJECT NO.	
February 1995		5010	
BUDGET ACTIVITY	PE NUMBER AND TITLE	FY 1996	FY 1997
5 - Engineering and Manufacturing Development	0604479F Milstar LDR/MDR Satellite Communications		
(U) B. <u>Program Change Summary (\$ in Thousands)</u>			
(U) Previous President's Budget		<u>FY 1994</u>	<u>FY 1995</u>
(U) Appropriated Value		868,162	607,248
(U) Adjustments to Appropriated Value		849,100	607,248
a. Cong Gen Reductions		-7,625	-10,238
b. SBIR		-13,100	-11,337
c. Omnibus and Other Above Threshold Reprogram		0	0
d. Below Threshold Reprogramming		0	-182
(U) Adjustments to Budget Years Since FY95 PB			
(U) Current Budget Submit/President's Budget		828,375	585,491
* The FY94 actuals reflect the actuals for the Space and Mission Control segments only. Funds were appropriated in PE #303601F.			
(U) Change Summary Explanation:			
Funding: Funding for a portion of Mission Planning Element (MPE) Phase II modification was deleted. Funding for the Milstar Training Augmentation Device (MTAD) was deleted.			
Schedule: Due to Titan IV manifest delays, Satellite 2 launch delayed to late FY95.			
Technical: None.			
(U) C. <u>Other Program Funding Summary (\$ in Thousands)</u>			
Not Applicable.			
Related RDT&E:			
(U) PE #303601F, Milstar Terminals			
(U) PE #303603F, Milstar Satellites			
(U) PE #603430F, Advanced MILSATCOM			
(U) PE #603432F, Polar Adjunct			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		PROJECT NO.	
BUDGET ACTIVITY					PE NUMBER AND TITLE					PROJECT NO.			
5 - Engineering and Manufacturing Development					0604479F Milstar LDR/MDR Satellite Communications					5010			
<u>Related RDT&E:</u>													
(U) PE #303142A, Defense Satellite Communications System Ground Terminals													
(U) PE #303605F, SATCOM Terminals													
(U) PE #303606F, Air Force Satellite Communications (AFSATCOM)													
(U) PE #303110F, Defense Satellite Communications System (DSCS)													
(U) PE #603433F, DSCS Replenishment													
(U) PE #305144F, Titan IV Space Launch Vehicles													
(U) PE #604577N, EHF Satellite Communications													
(U) PE #303142A, Tactical Communications Ground Environment													
(U) <u>D. Schedule Profile</u>													
<u>Milstar I (LDR Only)</u>													
DFS-1Launch													
DFS-2 Launch													
IOC I													
Milstar I (LDR) DT&E													
Satellite 1 Dedicated Asset Test													
Milstar I (LDR) OT&E, Phase I													
Milstar I (LDR) OT&E, Phase II													
<u>Milstar II (LDR/MDR)</u>													
Milstar II System PDR													
Milstar II Satellite CDR													
Milstar II System CDR													
Contract Award for DFS-5 & 6													

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)									
BUDGET ACTIVITY					DATE				
5 - Engineering and Manufacturing Development					PROJECT NO.				
					0604479F Milstar LDR/MDR Satellite Communications				
					1997				
					1996				
					1995				
					1994				
					1	2	3	4	1
					2	3	4	1	2
					3	4	1	2	3
					4	1	2	3	4
DFS-3M Launch									
DFS-4 Launch									
DFS-5 Launch									
DFS-6 Launch									
MDR IOT&E									
IOC II									
FOC									
3QFY99									
3QFY00									
3QFY01									
3QFY02									
2QFY00									
1QFY01									
1QFY05									
* Denotes completed activities.									

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE		PROJECT NO.	
BUDGET ACTIVITY		PE NUMBER AND TITLE		PROJECT NO.	
5 - Engineering and Manufacturing Development		0604479F Milstar LDR/MDR Satellite Communications		5010	
(U) A. <u>Project Cost Breakdown (\$ in Thousands)</u>					
		<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>
(U) DFS-1/2/3L		267,975	115,600	89,100	68,700
(U) DFS-3M		74,000	132,443	166,614	113,402
(U) DFS-4		393,600	137,997	278,930	289,034
(U) DFS-5			65,000	39,580	127,821
(U) DFS-6			55,000	12,242	80,335
(U) Other Government Costs		92,800	79,451	63,200	65,698
(U) Total		828,375	585,491	649,666	744,990
(U) B. <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u>					
Performing Organizations:					
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC*	Project Office EAC*	Total Prior to 1994
Product Development Organizations					
LMSC (Milstar I) [Sats 1,2,3L]	C/CPAF	Jun 83	2,142,000	2,142,000	4,286,454
LMSC (Milstar II) [Sats 3M, 4, 5, 6]	SS/CPAF	Oct 92/Nov 94	3,373,200	3,373,200	415,900

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)						DATE		February 1995		PROJECT NO.	
BUDGET ACTIVITY		PE NUMBER AND TITLE						0604479F Milstar LDR/MDR Satellite Communications 5010			
5 - Engineering and Manufacturing Development											
Performing Organizations:											
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC*	Project Office EAC*	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
Support and Management Organizations											
Aerospace	SS/CPFF/AF	Various			52,978	24,308	21,526	21,526	21,526	219,000	360,864
LINCOM	SS/CPAF	Various			4,750	4,319	5,322	4,993	4,498	3,480	27,362
Lincoln Lab	SS/MIPR	Various			3,385	2,500	11,900	3,087	2,653	3,000	26,525
CSC/TAG	SS/MIPR	Various			4,069	1,436	1,702	1,779	1,834	5,470	16,290
Trident Data Serv	SS/CPFF	Various			5,764	500	1,586	1,577	1,439	9,660	20,526
ANSER	CPFF	Feb 91			1,212	1,166	1,162	0	0	0	3,540
Misc					198,488	58,571	36,253	30,238	33,748	236,580	593,878
Test and Evaluation Organizations											
None.											
Subtotal Product Development											
					4,702,354	735,575	506,040	586,466	679,292	1,719,452	8,929,179
Subtotal Support and Management					270,646	92,800	79,451	63,200	65,698	477,190	1,048,985
Total Project					4,973,000	828,375	585,491	649,666	744,990	2,196,642	9,978,164

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February, 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
5 - Engineering And Manufacturing Development		0604480F GPS Block IIF								0005	
	COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
0005 Block IIF		0	0	19,699	38,901	77,405	68,349	65,552	65,038	Continuing	Continuing
<p>(U) A. Mission Description and Budget Item Justification</p> <p>This program element funds Research and Development for the NAVSTAR Global Positioning System (GPS) space, and control systems of the Block IIF Sustainment Program. This includes satellite design and development; control system, training simulator, and mission operation support center development, production and test; satellite upgrade design and development; control system, simulator and support center software upgrades; and R&D efforts to support deployment of GPS Block IIF. This PE is classified as research category/budget activity Engineering and Manufacturing Development (EMD) because it supports EMD of the GPS Block IIF satellite.</p> <p>(U) <u>FY 1994</u></p> <p>- (U) No funding in this PE.</p> <p>(U) <u>FY 1995</u></p> <p>- (U) No funding in this PE.</p> <p>(U) <u>FY 1996</u></p> <p>- (U) Award Contract for Block IIF - System Sustainment</p> <p>- (U) Satellite System Development (\$15,088)</p> <p>- (U) Ground System/Simulator Development (\$1,365)</p> <p>- (U) System Integration (\$3,246)</p> <p>(U) <u>FY 1997</u></p> <p>- (U) Continue Development of Block IIF - System Sustainment</p> <p>- (U) Satellite System Development (\$30,968)</p> <p>- (U) Ground System/Simulator Development (\$1,467)</p> <p>- (U) System Integration (\$6,466)</p>											

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February, 1995	PROJECT	0005
BUDGET ACTIVITY	PE NUMBER AND TITLE				
5 - Engineering And Manufacturing Development	0604480F GPS Block IIF				
(U) B. <u>Program Change Summary (\$ in Thousands)</u>					
(U) Previous President's Budget		FY 1994	FY 1995	FY 1996	FY 1997
(U) Appropriated Value		0	0	0	0
(U) Adjustments to Appropriated Value		0	0		
a. Cong Gen Reductions					
b. SBIR					
c. Omnibus or Other Above Threshold Reprogram					
d. Below Threshold Reprogramming					
(U) Adjustments to Budget Years Since FY95 PB				+19,699	+38,901
(U) Current Budget Submit/President's Budget		0	0	19,699	38,901
					Continuing
(U) Change Summary Explanation:					
Funding: New PE. Funding transferred from PE #305165F.					
Schedule: New PE. Funding transferred from PE #305165F.					
Technical: Not Applicable.					
(U) C. <u>Other Program Funding Summary (\$ in Thousands)</u>					
(U) Not Applicable.					
<u>Related RDT&E:</u>					
(U) PE 0305164F, Navstar GPS (User Equipment), provides receivers to use the positioning, navigation, and timing signals from satellites.					
(U) PE 0101221N, Fleet Ballistic Missile System, range positioning.					
(U) PE 0301357F and 0305913F (formerly 0102433F), Nuclear Detonation Detection System (NDS), fund NDS payloads on the GPS satellites.					
(U) PE 0305119F Space Boosters, funds launch services (Delta II).					
(U) PE 0305130F, Consolidated Space Operations Center (CSOC), funds CSOC which hosts the operational GPS Master Control Station.					
(U) PE 0305165F, NAVSTAR GPS Space/Control, funds for Block IIR, CSEL, JPO support, and current ground system.					

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)						DATE	PROJECT
BUDGET ACTIVITY	PE NUMBER AND TITLE						
5 - Engineering And Manufacturing Development	0604480F GPS Block IIF						0005
(U) D. <u>Schedule Profile</u>							
(U) Award Block IIF System Sustainment Contract	FY 1994 1 2 3	4	1	FY 1995 2 3	4	1	FY 1997 2 3
(U) System Design Review					X		

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

5 - Engineering And Manufacturing Development

0604480F GPS Block IIF

0005

(U) A. Project Cost Breakdown (\$ in Thousands)

	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>
(U) Block IIF Development	n/a	n/a	19,699	38,901
(U) Total			19,699	38,901

(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)Performing Organizations:

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1994	<u>Budget FY 1994</u>	<u>Budget FY 1995</u>	<u>Budget FY 1996</u>	<u>Budget FY 1997</u>	Budget to Complete	Total Program
<u>Product Development Organizations</u>											
Block IIF Development (TBD)	TBD	Nov 95	n/a	n/a	n/a	n/a	n/a	19,699	38,901	Cont	Cont
Subtotal Product Development								19,699	38,901	Cont	Cont
Subtotal Support and Management											
Subtotal Test and Evaluation											
Total Project								19,699	38,901	Cont	Cont

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)								DATE		February 1995	
BUDGET ACTIVITY				PE NUMBER AND TITLE							
#5 Engineering & Manufacturing Development				0604600F Munitions Dispenser Development							
COST (\$ in Thousands)	FY 1994 Actual	FY 1995* Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Total Program Element (PE) Cost	0	26,825	53,254	58,914	18,834	8,158	0	0	0	165,985	
1015 Munitions Dispenser Development	0	26,825	53,254	58,914	18,834	8,158	0	0	0	165,985	
* This program was previously funded in PE 0604604F Submunitions.											
(U) A. <u>Mission Description and Budget Item Justification</u>											
This PE develops a guidance kit for the CBU-87/B, CBU-89/B, and the CBU-97/B dispensers that provide inertial navigation to correct for the effects of wind transients and ballistic errors caused by wind when these munitions are released from medium to high altitudes. WCMD Kit fitted weapons will improve effectiveness of both bombers and fighters and significantly contribute to Air Force war fighting capabilities in two nearly simultaneous Major Regional Conflicts (MRC). WCMD Kit fitted CBU-97's dropped from bombers are key to stopping enemy armored forces in the second MRC. A full and open competition in FY 95 leads to dual awards for a competitive development effort that includes a competitive fly-off and also maintains the option for competition in production. This is funded in Engineering and Manufacturing Development because it started development in FY 95. This program was previously funded in PE 0604604F.											
(U) <u>FY 1995</u>											
- Award EMD dual contracts for Test Hardware Design and Fabrication (\$15,000)											
- Conduct government test (\$600)											
- Program management support; includes travel, program office supplies and equipment, training, and technical engineering support (\$4,325)											
- Provide other government support, GFE (\$3,400)											
- Start aircraft integration (\$3,500)											
(U) <u>FY 1996</u>											
- Continue dual EMD contracts for test hardware fabrication and aircraft integration (\$26,600)											
- Program management support; includes travel, program office supplies and equipment, training, and technical engineering support (\$5,554)											
- Conduct flight/ground tests (\$400)											
- Provide other government support, GFE (\$4,400)											
- Continue aircraft integration (\$13,500)											
- Development of Common Munitions Built-In-Test (BIT)/ Reprogramming Equipment (CMBRE) (\$2,800)											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

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BUDGET ACTIVITY

PE NUMBER AND TITLE

#5 Engineering & Manufacturing Development

0604600F Munitions Dispenser Development

(U) FY 1997

- Continue dual EMD contracts (\$38,300)
- Continue flight tests (\$3,600)
- Program management support; includes travel, program office supplies and equipment, training, and technical engineering support (\$6,314)
- Provide other government support; GFE (\$4,000)
- Continue aircraft integration (\$6,700)

(U) B. Program Change Summary (\$ in Thousands)

1994	1995	1996	1997	Cost
0	21,468	23,727	35,615	TBD

Previous President's Budget (PE 64604F)

Appropriated Value

Adjustments to Appropriated Value:

- a. Congressional Gen Reductions
- b. Below Threshold Reprogramming
- c. SBIR

Adjustment to Budget Year since FY95 PB

Current Budget Submit/President's Budget (PE 64600F)

Change Summary Explanation:

Summary Expenditures:
Funding: The \$2.0M congressional add in FY 95 initiates B-52 integration efforts. The congressional reductions in FY 95 were applied for SBIR (\$442K) and Non-FFRDC (\$200K). A below threshold reprogramming was initiated in FY 95 (\$3,999K) to cover support costs and contractual requirements. The FY96 request increased by \$29.5M and the FY97 request increased by \$23.3M for a revised acquisition strategy which includes competitive development with option for competition in production and for WCMD Kit and Joint Standoff Weapon (JSOW) F 16 fleet integration.

Schedule: No change.

Technical: No change.

(U) C. Other Program Funding Summary (\$ in Thousands)

	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>Compl</u>	<u>Cost</u>
Missile Procurement AF, BA 6, Munitions and Related Equipment										
WCMD Kit Production	0	0	0	0	16,707	25,817	82,107	82,126	1,171,300	1,378,057

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE _____

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

#5 Engineering & Manufacturing Development

0604600F Munitions Dispenser Development

(U) D. Schedule Profile	1994				1995				1996				1997			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
(U) Acquisition Milestones Milestone O Review*	X															
Milestone I/II Review				X												
(U) Engineering Milestones Design Reviews					X											
Pilot Production							X									
(U) T&E Milestones Acft Cert Test								X								
Dev Testing									X							
Competitive Fly-off											X					
(U) Contract Milestones EMD Contract Award																
Downselect							X									
(U) Other Program Events Milestone III -- FY00 2Qtr																
DT/OT -- FY98 1Qtr																
LRIIP -- FY98 2Qtr																
RAA -- FY99 4Qtr																
FRP -- FY00 2Qtr																

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

#5 Engineering & Manufacturing Development

0604600F Munitions Dispenser Development

1015

(U) A. Project Cost Breakdown (\$ in Thousands)

	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>
Major Contracts	0	15,000	26,600	38,300
Support Contracts	0	2,500	2,254	2,314
Program Office Support	0	1,825	3,300	4,000
Test and Evaluation	0	600	400	3,600
Aircraft Integration	0	3,500	13,500	6,700
Government Furnished Equipment (GFE)	0	3,400	4,400	4,000
CMBRE			2,800	
Total	0	26,825	53,254	58,914

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#5 Engineering & Manufacturing Development		0604600F Munitions Dispenser Development								1015	
(U) B. <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u>											
(U) <u>Performing Organizations:</u>											
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
(U) <u>Product Development Organizations</u>											
Contractors, C/CPAF		Jan 95		88,400	0	0	15,000	26,600	38,300	8,500	88,400
Alliant, Minneapolis, MN											
Martin Marietta, Orlando, FL											
(U) <u>Support and Management Organizations</u>											
SVERDRUP, C/CPAF		Dec 95		6,918	0	0	1,500	1,454	1,514	2,450	6,918
Unknown, C/CPAF		Dec 95		1,950	0	0	500	500	500	450	1,950
SAIC, C/CPAF		May 96		1,700	0	0	500	300	300	600	1,700
ASC/YH-1, Eglin AFB, FL		Oct 95 - Sep 96		11,855	0	0	1,825	3,300	4,000	2,730	11,855
(U) <u>Test and Evaluation Organizations</u>											
Testing at following facilities:		Apr 96		10,962	0	0	600	400	3,600	6,362	10,962
Test Wing, Eglin AFB											
Arnold Engr Development Center, TN											
Aircraft Integration				26,200	0	0	3,500	13,500	6,700	2,500	26,200

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

#5 Engineering & Manufacturing Development

0604600F Munitions Dispenser Development

1015

(U) B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)

(U) Government Furnished Property:

Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
(U) Product Development Property										
Sensor Fuzed Weapon (TDS)		Feb 95	Dec 96	0	0	2,950	3,400	4,000	3,400	13,750
GATOR (Honeywell or Aerojet)		Jun 96	Dec 96	0	0	0	500	0	0	500
CEM (Aerojet or Alliant)		Jun 95	Dec 96	0	0	450	500	0	0	950
CMBRE							2,800			2,800

(U) Support and Management Property

(U) Test and Evaluation Property

(U) Subtotal Product Development		0	0	18,400	0	33,800	42,300	11,900	106,400
(U) Subtotal Support and Management		0	0	4,325	0	5,554	6,314	6,230	22,423
(U) Subtotal Test and Evaluation		0	0	600	0	400	3,600	6,362	10,962
(U) Aircraft Integration		0	0	3,500	0	13,500	6,700	2,500	26,200
(U) Total Project		0	0	26,825	0	53,254	58,914	26,992	165,985

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

#5 Engineering and Manufacturing Development

#0604602F - Armament/Ordnance Development

COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	11,116	18,294	8,075	3,815	1,663	144	149	149	Cont	TBD
2784/Armament Standardization/Control/ Munitions Material Handling Equipment	1,887	1,371	0	0	0	0	0	0	Cont	TBD
3133/Bombs and Fuzes	7,341	16,720	7,935	3,675	1,521	0	0	0	0	38,078
4003/Adverse Terrain Ammunition Trailer	497	0	0	0	0	0	0	0	0	497
5613/Container Design Retrieval System	1,391	203	140	140	142	144	149	149	Cont.	TBD

(U) A. Mission Description and Budget Item Justification

The Armament Standardization/Control/Munitions Material Handling Equipment (MMHE), Project 2784, and the Container Design Retrieval System (CDRS), Project 5613, satisfy several USAF and tri-service requirements for standardization of armament and support equipment and eliminate unnecessary duplication of MMHE and containers. (Funding for Project 2784 for FY96 and beyond was transferred to PE 27590F, SEEK EAGLE.) The Bomb and Fuzes Project 3133 satisfies TAF ROC 323-75, Proximity Fuzes, dated 2 Sep 75; TAF SON 305-85, Hardened Target Munitions, dated 14 Oct 86; OSD letter requirement for a common bomb fuze, dated 11 Apr 80; SAC message 041901Z Feb 87, M117 High Drag Capability(s); Joint Mission Need Statement (MNS) TAF 401-91 for Adverse Weather Strike Capability, dated 4 Nov 91; and CAF MNS 314-90 for the Advanced Fuze Family, dated 13 May 93. This project funds development of a specific fuze type for air-to-ground munitions. The Adverse Terrain Ammunition Assembly Trailer/Adverse Terrain Tow Vehicle (ATAAT/ATTV), Project 4003, satisfies TAF SON 314-87, ATAAT/ATTV, dated 18 Nov 88, and funds development of an improved munitions trailer and tow vehicle. The RDT&E Research Category/Budget Activity is Engineering and Manufacturing Development because the projects support the EMD development phase of several munitions related items and functions.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE		February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE	
#5 Engineering and Manufacturing Development		#0604602F - Armament/Ordnance Development	
(U) B. <u>Program Change Summary (\$ in Thousands)</u>			
Previous President's Budget	1994	1995	1996
Appropriated Value	11,292	10,853	10,002
Adjustments to Appropriated Value	11,407	18,853	5,734
a. General Congressional Reduction	-115	-205	
b. Below Threshold Reprogramming	-46		
c. SBIR	-130	-354	
Adjustments to Budget Years Since FY95 PB			
Current Budget Submit/President's Budget	11,116	18,294	-1,927
			8,075
			-1,919
			3,815
			Continuing
			Total Cost
			Continuing
Change Summary Explanation:			
Funding: General Congressional Reductions in FY94/95 result from FFRDC, non-FFRDC, University research, and Travel reductions.			
FY95: Congressional increase to fund demonstration of Conventional Air-Launched Cruise Missile anti-armor variant. FY96/97: Changes result from inflation adjustment and transfer of Project 2784 (Armament/Standardization/Control/Munitions Material Handling Equipment) from PE64602 (Armament/Ordnance Development) to PE 27590F (SEEK EAGLE) starting in FY 96.			
Schedule: N/A			
Technical: N/A			
(U) C. <u>Other Program Funding Summary (\$ in Thousands)</u>			
Appropriation Missile Procurement, AF: Budget Activity 6, Munitions and Related Equipment;	1994	1995	1996
PE: 0208030F Program Title: Joint Programmable Fuze WSC 276170	0	0	0
	0	4,125	6,240
		8,830	8,890
		9,158	230,536
			259,529
			To Compl
			Total Cost

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#5 - Engineering and Manufacturing Development		#0604602F - Armament/Ordnance Development								2784	
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Armament Standardization/Control/Munitions Material Handling Equipment	1,887	1,371	0	0	0	0	0	0	Cont	TBD	
<p>(U) A. <u>Mission Description and Budget Item Justification</u></p> <p><u>Armament Standardization/Control/Munitions Material Handling Equipment (MMHE)</u>: This continuing project develops and improves the standardization and commonality of improved munitions handling and armament equipment to preclude duplication and proliferation. This project's efforts are limited to the study, design, and development of MMHE and armament control systems. Any procurement will be performed and funded by the applicable weapons system project. (Funding for Project 2784 for FY96 and beyond was transferred to PE 27590F, SEEK EAGLE.)</p> <p><u>FY 1994 Accomplishments (\$ in Thousands)</u>:</p> <ul style="list-style-type: none"> - Initiated/continued/completed design/development of various MMHE projects, including completing design and prototype of the B-1B RAM assembly, interim ENTERPAC Ram assembly, Conventional Bomb Module Trailer modification, GBU-28 Handling Bar, and Enhanced Missile Maintenance Stand. (\$843) - Continued robotic feasibility study and initiated conceptual design of Advanced Technology Demonstrator. (\$297) - Completed procurement action with Navy for an AF Linkless Ammunition Loading System (LALS) II prototype advanced ammo loader. (\$730) - Completed Phase 1 study for feasible Universal Armament tester. (\$17) <p><u>FY 1995 Plans (\$ in Thousands)</u>:</p> <ul style="list-style-type: none"> - Initiate/continue/complete design/development of various MMHE projects, including completing design of B1-B Preload Adapter, F-22 Pylon Adapter, and testing of Navy LALS, B-1 Ram Assembly, and B-1 T-bar Adapter, and conduct MHU-110 Upgrade Evaluation. (\$1,026) - Complete conceptual design robotics Advanced Technological Demonstrator. (\$235) - Complete evaluation of universal armament test capability. (\$10) - Complete design B-1/B-52/B-2 Rotary Launcher Load Adapter and B-52H Pylon Load Adapter. (\$100) 											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY		DATE	PROJECT NO.
#5 - Engineering and Manufacturing Development		February 1995	2784
PE NUMBER AND TITLE		#0604602F - Armament/Ordnance Development	
(U) A. <u>Mission Description and Budget Item Justification (cont)</u>			
<u>FY 1996 Plans (\$ in Thousands)</u>			
- Project transferred to PE 27590, SEEK EAGLE.			
(U) B. <u>Program Change Summary (\$ in Thousands)</u>			
Previous President's Budget	1994	1995	Total
Appropriated Value	1,887	1,830	Cost
Adjustments to Appropriated Value	2,002	1,830	TBD
a. General Congressional Reduction	-115	-105	
b. Below Threshold Reprogramming		-354	
c. SBIR			
d. Adjustments to Budget Years Since FY95 PB			
Current Budget Submit/President's Budget	1,887	1,371	TBD
Change Summary Explanation:			
Funding: General Congressional Reductions in FY94/95 result from FFRDC, non-FFRDC, University research, and Travel reductions. Project funding and responsibility for FY96 and beyond was transferred to PE 27590, SEEK EAGLE.			
Schedule: N/A			
Technical: N/A			
(U) C. <u>Other Program Funding Summary (\$ in Thousands)</u> : Not Applicable			
Related Activities: There is no other unnecessary duplication of effort within the Air Force or Department of Defense.			

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE		February 1995	
BUDGET ACTIVITY				PE NUMBER AND TITLE						PROJECT NO.			
#5 - Engineering and Manufacturing Development				0604602F - Armament/Ordnance Development						2784			
(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)													
Performing Organizations:													
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program		
Product Development Organizations:													
Naval Air Warfare Center	PO	Sep 93	830	1040		730	310	0	0	0	1040		
Dept of Energy/NASA	PO	Mar 94	TBD	TBD		267	235	0	0	TBD	TBD		
Support and Management Organizations:													
TEAS/TEAMS	CP	Oct 93	TBD	TBD		330	398	0	0	TBD	TBD		
ASC/ALZ	CP	Oct 93	TBD	TBD		230	222	0	0	TBD	TBD		
Other	Oct 93	TBD	TBD		284	320	186	0	0	TBD			
Test and Evaluation Organizations													
46th Test Wing	PO	Cont	TBD	TBD		10	20	0	0	TBD	TBD		
Government Furnished Property: Not Applicable													
Subtotal Product Development													
Subtotal Support and Management													
Subtotal Test and Evaluation													
Total Project													
					284	1,887	1,371	0	0	CONT	TBD		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#5 - Engineering and Manufacturing Development		#0604602F - Armament/Ordnance Development								3133	
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Bombs and Fuzes	7,341	16,720	7,935	3,675	1,521	0	0	0	0	30,078	
<p>(U) A. <u>Mission Description and Budget Item Justification</u></p> <p><u>Bombs and Fuzes</u>: This project develops and improves conventional bombs and fuzes including the development of the Joint Programmable Fuze (JPF) and a unitary warhead for the Joint Direct Attack Munition (JDAM) program.</p> <p><u>FY 1994 Accomplishments (\$ in Thousands)</u>:</p> <ul style="list-style-type: none"> - Continued the Joint Programmable Fuze (JPF) development effort, including the baseline design fabricating model hardware, defining test concepts, optimizing manufacturing processes, and completing the System Functional Review and the Preliminary Design Review. (\$2,034) - Began design and fabrication of JPF component hardware. (\$4,207) - Began JPF component hardware contractor test and evaluation (CT&E). (\$1,100) <p><u>FY 1995 Plans (\$ in Thousands)</u>:</p> <ul style="list-style-type: none"> - Continue the JPF development effort, including completion of detail design and CT&E. (\$1,000) - Begin JPF Developmental Test and Evaluation (DT&E). (\$6,284) - Begin fabricating JPF Initial Operational Test and Evaluation (IOT&E) hardware. (\$1,436) - Conduct Conventional Air-Launched Cruise Missile demonstration of Anti-Armor Variant. (\$8,000) <p><u>FY 1996 Plans (\$ in Thousands)</u>:</p> <ul style="list-style-type: none"> - Complete JPF DT&E. (\$1,125) - Complete fabrication of JPF IOT&E hardware. (\$6,168) - Begin JPF IOT&E. (\$642) <p><u>FY 1997 Plans (\$ in Thousands)</u>:</p> <ul style="list-style-type: none"> - Complete JPF IOT&E. (\$200) - Complete JPF Functional Configuration Audit, Production Readiness Review, and Physical Configuration Audit. (\$100) - Start JPF/JDAM Integration Flight Test. (\$3,375) 											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

#5 - Engineering and Manufacturing Development

#0604602F - Armament/Ordnance Development

3133

(U) B. Program Change Summary (\$ in Thousands)

	1994	1995	1996	1997	Total Cost
Previous President's Budget	7,517	8,820	7,976	3,693	28,006
Appropriated Value	7,517	16,820			
Adjustments to Appropriated Value		-100			
a. General Congressional Reductions	-46				
b. Below Threshold Reprogramming	-130				
c. SBIR					
d. Adjustments to Budget Years Since FY95 PB			-41	-18	
Current Budget Submit/President's Budget	7,341	16,720	7,935	3,675	38,078

Change Summary Explanation:

Funding: FY95: Congressional add of \$8Million for demonstration of Anti-Armor variant of Conventional Air-Launched Cruise Missile (CALCM).
General Congressional Reductions in FY94/95 result from FFRDC, non-FFRDC, University, and Travel reductions. FY96/97 reduced for inflation adjustments.

Schedule: N/A

Technical: N/A

(U) C. Other Program Funding Summary (\$ in Thousands)

	1994	1995	1996	1997	1998	1999	2000	2001	To Total Cost
Appropriation: Missile Procurement, AF: Budget Activity 6, Munitions and Related Equipment									
PE: 0208030F Program Title: Joint Programmable Fuze WSC 276170	0	0	0	4,125	6,240	8,830	8,890	9,158	230,536
									259,529

Related Activities:

PE 0604618F and PE 0604618N, Joint Direct Attack Munition

There is no other unnecessary duplication of effort within the Air Force or Department of Defense.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)											
BUDGET ACTIVITY		PE NUMBER AND TITLE									
#5 - Engineering and Manufacturing Development		#0604602F - Armament/Ordnance Development									
(U) D. <u>Schedule Profile</u>		PROJECT NO. 3133									
<u>Joint Programmable Fuze (JPF)</u>											

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

#5 - Engineering and Manufacturing Development

0604602F - Armament/Ordnance Development

3133

(U) A. Project Cost Breakdown (\$ in Thousands)

	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>
a. Contractor				
Hardware	1,760	1,611	4,430	500
Development	3,189	745	200	200
CT&E	770	532	0	500
Data	60	30	30	50
Contractor Total	5,779	2,918	4,660	1,250
b. Government				
Testing	485	3,941	1,380	523
Contractor support	67	507	520	540
Management Support	963	713	675	722
ECO	47	741	700	640
Government Total	1,562	5,902	3,275	2,425
c. CALCM Anti-Armor Demonstration	0	8,000	0	0
Total	7,341	16,720	7,935	3,675

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1995
BUDGET ACTIVITY					PE NUMBER AND TITLE					PROJECT NO.	
#5 - Engineering and Manufacturing Development					0604602F - Armament/Ordnance Development					3133	
(U) B. <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u>											
Performing Organizations:											
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
<u>Product Development Organizations</u>											
Motorola		Jul 93	11,100	15,147	540	5,779	2,918	4,660	1,250	0	15,147
<u>Support and Management Organizations</u>											
TEAS/TEAMS		Oct 92	2,094	2,094	346	23	445	480	500	300	2,094
ASC/YHP			3,606	3,606		919	751	660	700	400	3,430
Other			2,540	2,540		172	739	795	742	92	2,540
<u>Test and Evaluation Organizations</u>											
46th Test Wing		Mar 94	6,876	6,876	0	448	3,867	1,340	483	729	6,867
CALCM Anti-Armor Demo		TBD	TBD	TBD			8,000			0	8,000
Government Furnished Property: Not Applicable											
Subtotal Product Development											
Subtotal Support and Management											
Subtotal Test and Evaluation											
Total Project											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE										February 1995	
BUDGET ACTIVITY										PROJECT NO.	
#5 - Engineering and Manufacturing Development										#0604602F - Armament/Ordnance Development	
PE NUMBER AND TITLE										5613	
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Container Design Retrieval System	1,391	203	140	140	142	144	149	149	Cont.	TBD	

(U) A. Mission Description and Budget Item Justification

Containers: This project funds the operation of the tri-service Container Design Retrieval System (CDRS). This system includes the maintenance of a container database to preclude proliferation and duplication of munitions containers. It also supports organic container design, prototyping, and testing capabilities. This project's efforts are limited to the study, design, and development of container systems. Any procurement will be performed and funded by the applicable weapons system project.

FY 1994 Accomplishments (\$ in Thousands):

- Initiated/continued/completed design/development of various CDRS containers projects, including those for MILSTAR, GBU-15/AGM-130 all-up-round (AUR), Joint Stand-Off Weapon (JSOW), AGM-130 CCD Seeker, Advanced Medium Range Air-to-Air Missile (AMRAAM) Built-In Test (BIT) capability, and AGM-142 components (12 each). (not separately priced)
- Investigated problem of explosive gases outgassing from polyethylene foam and developed alternatives/solutions. (\$641)
- Provided engineering management support for the delivery of MILSTAR Contingency Terminal Container Sets (CTCS). (\$50)
- Operated and improved the CDRS data base and support service. (\$700)

FY 1995 Plans (\$ in Thousands):

- Initiate/continue/completed design/development of various CDRS projects including containers for the AGM-142 components, the Multi-Spectral Aircraft Decoy, the AMRAAM BIT modification, Special Projects, and the JSOW (AF). (\$43)
- Provide container design expertise, management, and technical support to ongoing programs under contract development or production such as JDAM, JSOW (Navy), AGM-130, DSU-33 A/B, Joint Programmable Fuze, and MILSTAR. (\$30)
- Manage and operate the CDRS and data base. (\$130)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	PROJECT NO.
BUDGET ACTIVITY	PE NUMBER AND TITLE		
#5 - Engineering and Manufacturing Development	#0604602F - Armament/Ordnance Development	February 1995	5613
(U) A. <u>Mission Description and Budget Item Justification (cont)</u>			
FY 1996 Plans (\$ in Thousands):			
<ul style="list-style-type: none"> - Initiate/continue/complete design/development of various CDRS projects, including the Multi-Spectral Aircraft Decoy and Special Projects. (\$5) - Provide container design expertise, management, and technical support to ongoing programs under contract development or production, such as AMRAAM AGM-142, JDAM, JSOW (AF and Navy), AGM-130, DSU-33 A/B, JPF, and MILSTAR. (\$5) - Manage and operate the CDRS data base and support service. (\$130) 			
FY 1997 Plans (\$ in Thousands):			
<ul style="list-style-type: none"> - Initiate/continue/complete design/development of various CDRS projects. (\$5) - Provide container design expertise, management, and technical support to ongoing programs under contract development or production. (\$5) - Manage and operate the CDRS data base and support service. (\$130) 			
(U) B. <u>Program Change Summary (\$ in Thousands)</u>			
Previous President's Budget	1994	1995	1996
Appropriated Value	1,391	203	203
Adjustments to Appropriated Value -- None	1,391	203	
a. Adjustments to Budget Years Since FY95 PB			
Current Budget Submit/President's Budget	1,391	203	-63
Change Summary Explanation:			140
Funding: FY96/97 changes result from a 30% reduction without prejudice due to fiscal constraints and inflation adjustments.			
Schedule: N/A			
Technical: N/A			
(U) C. <u>Other Program Funding Summary (\$ in Thousands):</u> Not Applicable			
Related Activities: There is no other unnecessary duplication of effort within the Air Force or Department of Defense.			
(U) D. <u>Schedule Profile:</u> Not Applicable			
		1997	Total
		201	Cost
			1,998
			1,874

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#5 - Engineering and Manufacturing Development		0604602F - Armament/Ordnance Development								5613	
(U) A. Project Cost Breakdown (\$ in Thousands)		1994	1995	1996	1997						
Travel/Transportation		80	60	50	50						
Supplies Equipment		153	60	60	60						
Contractor Support		800									
Mission Support		283	35	10	10						
Test Support		75	48	20	20						
Total		1,391	203	140	140						
(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)											
Performing Organizations:											
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
Product Development Organizations											
N/A											
Support and Management Organizations											
Sverdrup (TEAS)		Oct 93	TBD	TBD	700	800					
ASC/YHS			TBD	TBD	250	283	35	10	10	CONT.	TBD
Other			TBD	TBD	50	233	120	110	110	CONT.	TBD
Test and Evaluation Organizations											
46th Test Wing		Oct 93	TBD	TBD	115	75	48	20	20	CONT.	TBD

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1995
BUDGET ACTIVITY				PE NUMBER AND TITLE				PROJECT NO.			
#5 - Engineering and Manufacturing Development				0604602F - Armament/Ordnance Development				5613			
(U) B. <u>Budget Acquisition History and Planning Information (\$ in Thousands) (cont)</u>											
Government Furnished Property: Not Applicable											
Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program	
Subtotal Product Development N/A											
Subtotal Support and Management											
Subtotal Test and Evaluation											
Total Project											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY										DATE	
PE NUMBER AND TITLE										February 1995	
#5 Engineering & Manufacturing Development											
PE 0604604F Submunitions											
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Total Program Element (PE) Cost	3,738	3,432	4,953	5,105	5,164	5,186	5,304	5,428	Cont	TBD	
1015 WCMD Kit Development*	0	0	0	0	0	0	0	0	TBD	TBD	
1016 SFW Production Pgm Support**	0	0	0	0	0	0	0	0	TBD	TBD	
3166 Joint Smart Munitions T & E	3,738	3,432	4,953	5,105	5,164	5,186	5,304	5,428	Cont	TBD	

* This project is now funded in a stand-alone program element PE 0604600F, Munitions Dispenser Development (see Munitions Dispenser Development Descriptive Summary)

** This project is now funded in PE 0207320F, Sensor Fuzed Weapon

(U) A. Mission Description and Budget Item Justification

Project 3166 is a joint US Air Force/US Army program which evaluates developmental smart munitions and related emerging technology with applications against mobile ground vehicle targets and Theater Air Defense units by determining antiarmor/counter-battery munition performance against actual foreign targets in realistic environments and in the presence of countermeasures. Data gathered is used to meet developmental decision points requiring highly reliable, realistic performance data. The project is a major focal point for joint Air Force and Army target signature collection and dissemination for development and exploitation purposes. This PE provides support for smart munitions test and evaluation (T&E) activities including T&E support for programs in engineering and manufacturing development. This project is funded in EMD because it a continuing RDT&E activity supporting mostly acquisition programs in Engineering and Manufacturing Development.

(U) FY 1994

- (U) Continued Phase III of the weapon effectiveness evaluation program with focus on countermeasures (\$1,400)
- (U) Conducted seeker/sensor evaluation and analysis with emphasis on product improvement. Selected the next generation of seeker/sensor and warheads for evaluation and captive flight tests (\$1,000)

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#5 Engineering & Manufacturing Development	0604604F Submunitions	3166	
<ul style="list-style-type: none"> - (U) Evaluated warhead effectiveness and provided support to AF and Army offices (\$238) - (U) Conducted advanced design warheads tests and advanced mortar tests (\$300) - (U) Continued vulnerability analysis of new targets including specific Suppression of Enemy Air Defenses (SEAD) and critical mobile targets for Sensor Fuzed Weapon (SFW) and Silent Hard Kill (SHARK) programs (\$200) - (U) Measured and documented signature of threat vehicles to support Theater Missile Defense (TMD) and SEAD targeting and identification analyses (\$300) - (U) Supported the Joint Tactical Coordinating Group (JTCG) and AF/Army program offices in signature collection/analysis and simulator validation (\$100) - (U) Provided modeling and analysis support for simulated battlefield conditions (\$200) 			
(U) <u>FY 1995</u>			
<ul style="list-style-type: none"> - (U) Complete Phase III of the weapon effectiveness evaluation and initiate planning for Phase IV of the program (\$933) - (U) Select next generation of seeker/sensors and warheads for evaluation and start captive flight tests evaluation and analyses (\$749) - (U) Develop smart weapons models and simulations for digitized battlefields (\$300) - (U) Continue test support of smart munitions test community, for weapon effectiveness and target signature (\$650) - (U) Conduct advanced warhead effectiveness tests and analysis (\$500) - (U) Maintain detailed signature and warhead/vulnerability databases (\$300) 			
(U) <u>FY 1996</u>			
<ul style="list-style-type: none"> - (U) Start Phase IV of the weapon effectiveness evaluation. Develop models and simulation tools to support electronic engagement simulations (\$2,000) - (U) Continue maintenance and expansion of vulnerability/lethality and signature databases (\$600) - (U) Plan and conduct Captive Flight Tests for signature collection and seeker/sensor evaluations (\$1,000) - (U) Conduct advanced warhead effectiveness evaluation (\$753) - (U) Continue vulnerability analysis of SEAD and TMD targets (\$600) 			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

#5 Engineering & Manufacturing Development

0604604F Submunitions

3166

(U) FY 1997

- (U) Continue Phase IV of the weapon effectiveness evaluation. Develop models and simulation tools to support electronic engagement simulations (\$2,000)
- (U) Continue maintenance and expansion of vulnerability/lethality and signature databases (\$631)
- (U) Plan and conduct Captive Flight Tests for signature collection and seeker/sensor evaluations (\$1,100)
- (U) Conduct advanced warhead effectiveness evaluation (\$774)
- (U) Continue vulnerability analysis of Enemy Air Defense (SEAD), and Theater Missile Defense (TMD) targets (\$600).

(U) B. Program Change Summary (\$ in Thousands)

	1994	1995	1996	1997	Total Cost TBD
Previous President's Budget	3,835	3,612	6,979	6,232	
Appropriated Value	3,835	3,612			
Adjustments to Appropriated Value:					
a. Congressional Gen Reductions	-39	-113			
b. Below Threshold Reprogrammings	-14				
c. SBIR	-44	-67			
Adjustments to Budget Years since FY95 PB			-2,026	-1,127	
Current Budget Submit/President's Budget	3,738	3,432	4,953	5,105	TBD

Change Summary Explanation:

Funding: The FY94 Congressional reductions were \$39,000 and \$44,000 for SBIR. The Air Force reprogrammed \$14,000 (classified reprogramming). The FY95 Congressional reductions were \$113,000 and \$67,000 for SBIR.

Schedule: No change.
Technical: No change.

(U) C. Other Program Funding Summary (\$ in Thousands):

Related RDT&E: PE 0604600F, Munitions Dispenser Development; PE 0207320F, Sensor Fuzed Weapon.

(U) D. Schedule Profile: Not Applicable (target/warhead evaluation/analysis, signature tests, captive flight tests, etc. are ongoing throughout the year).

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	PROJECT NO.	
BUDGET ACTIVITY	PE NUMBER AND TITLE			
#5 Engineering & Manufacturing Development	0604604F Submunitions			3166
(U) A. <u>Project Cost Breakdown (\$ in Thousands)</u>				
		<u>1994</u>	<u>1995</u>	<u>1996</u>
Program Support		1,300	960	1,510
Target Support		700	673	783
Warhead Range Operations		350	300	320
Captive Flight Tests		612	700	800
Database Support (Inc TABLIS)		200	200	540
Vulnerability/Effectiveness Analysis		126	112	250
Warhead Evaluation		300	400	500
Target Signature Tests		150	87	250
Total		3,738	3,432	4,953
				5,105

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Exhibit R-3

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE						PROJECT NO.				
#5 Engineering & Manufacturing Development		0604604F Submunitions						3166				
(U) B. <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u>												
Performing Organizations:												
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program	
<u>Product Development Organizations: N/A</u>												
<u>Support and Management Organizations</u>												
Sverdrup	C/CIF	10/93			3,729	1,243	1,237	1,398	1,478	cont	TBD	
ISN	C/FFP	10/93			390	189	191	211	245	cont	TBD	
46 OG/OGML					3,447	383	301	421	460	cont	TBD	
<u>Test and Evaluation Organizations</u>												
46 OG/OGML					57,534	1,923	1,703	2,923	2,922	cont	TBD	
Total Project					65,100	3,738	3,432	4,953	5,105	cont	TBD	

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 95
BUDGET ACTIVITY		PE NUMBER AND TITLE									
5 - Engineering and Manufacturing Development		0604617F Air Base Operability									
COST (\$ In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Total Program Element (PE) Cost	10,739	5,413	9,692	3,064	1,482	2,699	2,778	2,861	Cont	TBD	
2895 Air Base Operability	6,258	2,562	9,692	3,064	1,482	2,699	2,778	2,861	Cont	TBD	
2621 Rapid Runway Repair	3,538	1,705	0	0	0	0	0	0	Comp	5,243	
3141 Camouflage, Concealment, and Deception	575	788	0	0	0	0	0	0	Comp	1,363	
4057 Survivable Airbase Utility Systems	310	45	0	0	0	0	0	0	Comp	355	
4058 Advanced Firefighting	58	313	0	0	0	0	0	0	Comp	371	
(U) A. Mission Description and Budget Item Justification											
Air Base Operability (ABO) integrates capabilities to deploy rapidly, defend, and sustain air base operations, which is prerequisite to establishing air superiority. Air Base Systems (ABS) provide beddown for aircraft, support equipment, and forces at both main operating bases and contingency operating locations, which may have only a runway and a water source. The need for ABS was dramatically illustrated during DESERT SHIELD/DESERT STORM/PROVIDE COMFORT, and other global contingencies over the past 5 years. Lighter-weight rapidly deployable facilities and equipment have become essential in supporting contingencies for security, base defense, relief efforts, and special operations throughout the world. Air Base Survivability (ABS) capabilities being developed include joint Service (Army-led) test, evaluation and acquisition of protective vehicles to be used by Air Force security police, civil engineers, and explosive ordnance disposal technicians for air base defense and reconnaissance missions; a deployable system to repair/reinforce runways; a deployable fire protection system to detect and extinguish aircraft, Petroleum, Oil, and Lubricants, and structural fires at remote locations; and camouflage, concealment and deception systems to protect critical mission resources. This program is under the research and development category which supports Engineering and											

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE		
5 - Engineering and Manufacturing Development	0604617F Air Base Operability		
(U) A. Mission Description and Budget Item Justification (Continued) Manufacturing Development (EMD) of selected ABS. Because of reduced funding and support for ABO in FY97 and beyond, we have consolidated program efforts into one project, 2895.			
(U) <u>EY 1994 (\$ in Thousands)</u>			
- (U) Supported Contingency Airfield Lighting System production contract. (\$100) (4QFY94)			
- (U) Completed DEM/VAL for Mobile Ordnance Disrupter. (\$3,500) (4QFY94)			
- (U) Initiated Pre-Planned Product Improvement (P3I) for Base Recovery Communication System (BRCS). (\$635) (1QFY94)			
- (U) Tested Commercial Off-The Shelf effort for the Explosive Ordnance Disposal (EOD) Mortuary Protective Shield. (\$138) (2QFY94)			
- (U) Continued EMD for Deployable Pavement Repair System. (\$880) (4QFY94)			
- (U) Supported production contract for Petroleum, Oil and Lubricants (POL) Rapid Utilities Repair Kit (RURK) I. (\$40) (4QFY94)			
- (U) Supported production contract for POL RURK II. (\$370) (4QFY94)			
- (U) Completed EMD for Mat Anchoring. (\$163) (4QFY94)			
- (U) Supported EMD for Camouflage, Concealment and Deception. (\$755) (4QFY94)			
- (U) Initiated studies to support EMD activities for Repair Quality Criteria and Bare Base programs. (\$3,259) (4QFY94)			
- (U) Continued other technical support. (\$899) (4QFY94)			
(U) <u>EY 1995 (\$ in Thousands)</u>			
- (U) Provide technical support for the EOD Mortuary Shield program. (\$31) (4QFY95)			
- (U) Continue Rapid Runway Repair program. (\$1,682) (4QFY95)			
- (U) Continue CCD EMD program. (\$1,113) (4QFY95)			
- (U) Continue technical support for POL RURK I (\$56) (4QFY95)			
- (U) Award EMD contract for Deployable Fire Protection System (DFPS). (\$455) (4QFY95)			
- (U) Continue Other Technical Support. (\$262) (4QFY95)			
- (U) Integrate Base Recovery Communications System with the Wing Command and Control System. (\$1,500) (4QFY95)			
- (U) Update Worldwide ABO Threat Compendium. (\$44) (3QFY95)			
- (U) Monitor Army EMD contract for the Armored Multi-Role Vehicle (ARMRV). (\$270) (1QFY95)			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE	
5 - Engineering and Manufacturing Development		0604617F - Air Base Operability	
(U) A. Mission Description and Budget Item Justification (Continued):			
(U) FY 1996 (\$ in Thousands)			
-	(U) Monitor Army ARMRV production contract. (\$25) (2QFY96)		
-	(U) Support Deployable Pavement Repair System (DPRS) production contract. (\$25) (4QFY96)		
-	(U) Continue Deployable Fire Protection System (DFPS) Engineering and Manufacturing Development (EMD). (\$326) (4QFY96)		
-	(U) Continue Repair Quality Criteria (RQC) for Rapid Runway Repair (RRR) program. (\$1,000) (3QFY96)		
-	(U) Continue Camouflage, Concealment and Deception (CCD) program. (\$4,725) (3QFY96)		
-	(U) Award EMD contract for Rapid Ordnance Removal (RORS) System. (\$850) (3QFY96)		
-	(U) Initiate Bare Base EMD study. (\$500) (2QFY96)		
-	(U) Continue Other Technical Support. (\$2,241) (4QFY96)		
(U) FY 1997 (\$ in Thousands)			
-	(U) Continue to monitor Army Armored Multi-Role Vehicle production contract. (\$25) (4QFY97)		
-	(U) Continue to support Deployable Pavement Repair System production contract. (\$25) (4QFY97)		
-	(U) Support production contract for DFPS. (\$13) (4QFY97)		
-	(U) Continue RQC program for RRR. (\$500) (3QFY97)		
-	(U) Continue CCD program. (\$1,000) (3QFY97)		
-	(U) Continue EMD of RORS. (\$500) (3QFY97)		
-	(U) Continue Other Technical Support. (\$1,001) (4QFY97)		
(U) B. Program Change Summary (\$ in Thousands)			
Previous President's Budget	1994	1995	1996
Appropriated Value	10,912	9,580	14,908
Adjustments to Appropriated Value	10,912	5,580	
a. General Congressional Reductions	-68	-62	
b. Below Threshold Reprogrammings	-105	-105	
c. SBIR			
Adjustments to Budget Years Since FY 95 PB	10,739	5,413	-5,216
Current Budget Submit/President's Budget			3,064
			Cont
			Cost
			Cont

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE									
5 - Engineering and Manufacturing Development		0604617F - Air Base Operability									
(U) B. Program Change Summary (\$ in Thousands) (Continued)											
Change Summary Explanation: MODS has been cancelled; BRCS has been merged with the Air Force's WCCS program; ARMRV has been reduced to monitoring similar joint program.											
Funding:											
Schedule:											
Technical: Not Applicable											
(U) C. Other Program Funding Summary (\$ in Thousands)											
		1994	1995	1996	1997	1998	1999	2000	2001	To	Total Cost
Other Procurement, AF, BA 62, Other Base Maintenance and Support Program, Vehicles		3,217	0	4,974	4,974	7,851	10,282	0	0	0	31,298
Other Procurement, AF, BA 63, Other Base Maintenance and Support Program, Communications		7,339	7,423	0	0	0	0	0	0	0	14,762
Other Procurement, AF, BA 64, Other Base Maintenance and Support Program, Explosive Ordnance Disposal		3,958	0	0	0	1,000	1,000	0	0	0	5,958
Other Procurement, AF, BA 64, Other Base Maintenance and Support Program, Camouflage, Concealment and Deception		4,475	1,690	0	0	0	7,427	15,338	1,552	TBD	30,482
Other Procurement, AF, BA 64, Other Base Maintenance and Support Program, Rapid Runway Repair (Deployable Pavement Repair System, Mobile Aircraft Arresting System Upgrade, Minimum Operating Strip Marking)		2,094	1,895	3,439	3,725	8,828	0	0	0	0	19,981
Other Procurement, AF, BA 64, Other Base Maintenance and Support Program, Deployable Fire Protection System		1	0	877	1,274	119	0	0	0	0	2,270
Other Procurement, AF, BA 64, Other Base Maintenance and Support Program, Petroleum-Oil-Lubricants Rapid Utilities Repair Kit		2320	1,475	0	0	0	0	0	0	0	3,795

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE _____

February 1995

BUDGET ACTIVITY

5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE

0604617F - Air Base Operability

(U) D.	Schedule Profile
	Base Recovery Comm System (BRCS)
	Integrate with CRISIS/WCCS
	Armored Recon Vehicle (ARMRV)
	EMD
	IOT&E
	IOC
	EOD Medical Protective Shield
	Complete EMD
	DPRS
	EMD
	IOT&E
	Award Production Contract
	Exercise Production Option
	DFPS
	EMD
	IOT&E
	CCD
	Multi-Spectral Nets
	Award EMD Contract
	DT&E/IOT&E
	Multi-Spectral Decoys
	DT&E/IOT&E

* = Start

**** = Complete**

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE		
5 - Engineering and Manufacturing Development	0604617F - Air Base Operability		
(U) A. <u>Project Cost Breakdown (\$ in Thousands)</u>			
		<u>1994</u>	<u>1995</u>
		<u>1996</u>	<u>1997</u>
Demonstration/Validation		3,550	0
Engineering and Manufacturing Development		4,626	2,204
Development Test And Evaluation/Initial Operational Test and Evaluation		138	421
Contractor Support		1,066	692
Miscellaneous		460	1,834
Other Technical Support		899	262
TOTAL		10,739	5,413
			9,692
			3,064

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1995
BUDGET ACTIVITY											
PE NUMBER AND TITLE											
0604617F - Air Base Operability											
(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)											
Performing Organizations:											
Contractor or Government Performing Activity	Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
Product Development Organizations											
MODS											
Numerous	N/A	N/A	N/A	N/A	3,051	3,500	0	0	0	0	6,551
ARMRV											
Army TACOM	MIPR	TBD	TBD	TBD	0	0	270	25	25	50	370
Deployable Fire Protection System											
Unknown	C/FFP	Jun 95	891	891	94	0	458	326	13	0	891
POL Rapid Utilities Repair Kit for POL Phase I											
Keko	C/FP	Sep 95	134	134	63	40	31	0	0	0	134
POL Rapid Utilities Repair Kit for POL Phase II											
Unknown	C/FFP	Mar 95	1,265	1,265	870	370	25	0	0	0	1,265
Deployable Pavement Repair System											
Entwhistle	Various	Jan 96	4,154	4,154	2,319	880	880	25	25	25	4,154
Camouflage, Concealment, and Deception											
Various	Various	Various	12,693	12,693	1,126	1,220	1,138	4,725	1,000	TBD	9,209
Mat Anchoring											
ARA	C/FP	Unknown	188	188	0	163	25	0	0	0	188
Rapid Ordnance Removal System											
Unknown	Incomp	Incomp	1,350	1,350	0	0	0	850	500	0	1,350

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

5 - Engineering and Manufacturing Development
0604617F - Air Base Operability

(U) B. Budget Acquisition History and Planning Information (\$ in Thousands). (Continued)
Performing Organizations:

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
EMD Studies Various	Various	Various	7,238	7,238	1,464	2,930	844	1,500	500	0	7,238
EOD Mortuary Shield Unknown	Various	Various	169	169	0	138	31	0	0	0	169
CALS Multi-Electric FFP	Unknown	Unknown	Unknown	Unknown	Unknown	100	0	0	0	0	TBD
BRCS Sumaria	Various	Jun 94	2,535	2,535	400	635	1,500	0	0	0	2,535
Support and Management Organizations Various	Various	Various				763	211	2,241	1,001	TBD	TBD
<u>Test and Evaluation Organizations</u> Not Applicable											
Government Furnished Property: None											
Subtotal Product Development			TBD	TBD	TBD	9,976	5,202	7,451	2,063	75	
Subtotal Support and Management						763	211	2,241	1,001	TBD	TBD
Total Project						10,739	5,413	9,692	3,064	TBD	

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE									
#5 - Engineering and Manufacturing Development		# 0604618 - Joint Direct Attack Munition (JDAM) 3890									
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Total Program Element (PE) Cost	61,892	65,570	92,161	85,907	47,327	31,177	5,249	4,936	281,942	697,519	

A. Mission Description and Budget Item Justification

(U) Operation Desert Storm confirmed the need for a more accurate weapon delivery capability in adverse weather conditions and from medium/high altitudes. Failure to satisfy this requirement will allow the enemy to continue to take advantage of the sanctuary of weather and/or prevent US air power from prosecuting a conflict on its terms. JDAM is an Air Force and Navy munitions program to correct these shortfalls, with the Air Force as the executive service. JDAM will upgrade the existing inventory of general purpose bombs (MK 84, BLU-109/B, and MK 83) by integrating them with a guidance kit consisting of a global positioning system aided inertial navigation system (GPS/INS). JDAM will provide an accurate (13 meters) adverse weather capability. JDAM will initially be integrated with the B-2, B-1B and F/A-18C/D aircraft with follow-on integration on the F-16, F-15E, F-22 and other aircraft. The JDAM Product Improvement Program (PIP) will field improvements to the JDAM system, with emphasis on attaining precision (3 meters) accuracy through both non-seeker and seeker initiatives. JDAM development will proceed in a two-phased Engineering and Manufacturing Development (EMD) effort. EMD Phase 1 will emphasize competitive design and manufacturing processes. EMD Phase II will emphasize full scale hardware build and flight test to verify system performance and will also support OT&E. This program is funded in Engineering Manufacturing Development Budget Activity because of the focus on devising an affordable design and manufacturing process.

(U) FY 1994

- (U) Began competitive design and manufacturing processes phase of Engineering and Manufacturing Development (EMD Phase 1) with two contractors. (\$45,697)
- (U) Completed precision guidance Concept Exploration studies. Began concept analysis/demonstration of Differential GPS (DGPS), Targeting Location Error/Mission Planning (TLE/MP) and Millimeter Wave (MMW) and Synthetic Aperture Radar (SAR) seekers for precision guidance. (\$4,174)
- (U) Continue JDAM aircraft interface definition and development support activities. (\$12,021)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE
BUDGET ACTIVITY		February 1995
#5 - Engineering and Manufacturing Development		PE NUMBER AND TITLE
A. <u>Mission Description and Budget Item Justification (Cont'd)</u>		# 0604618 - Joint Direct Attack Munition (JDAM) 3890
<p>(U) FY 1995</p> <ul style="list-style-type: none"> - (U) Conduct wind tunnel tests of both contractors hardware. (\$11,300) - (U) Continue Program Office Mission/Engineering Support tasks and EMD Phase 1 effort, including aircraft/weapon capability efforts, fabrication and testing EMD Phase I DT&E test hardware, such as engineering evaluation units, instrumented measurement vehicles, laboratory test guidance kits, separation test vehicles and guided test vehicles. (\$42,670) - (U) Continue the Differential GPS (DGPS), Mission Planning/Target Location Error (MP/TLE), and precision guidance concept demonstrations, and initiate concept exploration studies for anti-jam capabilities. (\$11,600) <p>(U) FY 1996</p> <ul style="list-style-type: none"> - (U) Continue Program Office Mission Engineering Support tasks, begin EMD Phase 2 development efforts, and procure 150 EMD assets for the B-2 GPS Aided Targeting System (GATS). (\$75,547). - (U) Complete IMV testing and begin F/A-18, F-16 (AF MK84), B-2 and B-1 DT&E testing (Safe Separation) and Mission Planning efforts. (\$7,714) - (U) Continue DGPS, MP/TLE, and precision guidance concept demonstration efforts, continue concept exploration studies for anti-jam capabilities. (\$8,900) <p>(U) FY 1997</p> <ul style="list-style-type: none"> - (U) Continue Program Office Mission/Engineering Support tasks, Phase 2 EMD and in-house effort. (\$21,904) - (U) Complete safe separation tests for F-16, B-2, and B-1. Conduct B-2 DT&E and continue DT&E (live launches) on F/A-18, F-16 (AF MK84) and B-1. (\$50,703) - (U) Continue DGPS, MP/TLE, and precision guidance concept demonstrations efforts, continue concept exploration studies for anti-jam capabilities. (\$13,300) 		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE	
#5 - Engineering and Manufacturing Development		# 0604618 - Joint Direct Attack Munition (JDAM)	3890
<p>A. <u>Mission Description and Budget Item Justification (Cont.)</u></p> <p><u>Acquisition Strategy:</u></p> <p>Acquisition: Milestone I Review was held on 1 October 1993, which granted approval for JDAM to enter into an 18-month competitive design and manufacturing processes phase. During the Defense Acquisition Board (DAB) there was an agreement that the primary focus of this phase, referred to a EMD Phase 1, would be on devising an affordable design and manufacturing process for a system to meet the stated operational requirement. This approach involves a concurrently engineered design and Phase 1 emphasis on developing and validating the manufacturing processes for the system. This contrasts to a more conventional DEM/VAL where the emphasis is on reducing technical risk. JDAM's technical risk is already low. Phase 1 also includes both a Critical Design Review and an initial Production Readiness Review. Concurrent with the Phase 1 development activities, the Air Force will update the documentation required for the Milestone II Review planned for October 1995, following the 18-month Phase 1 effort. With Milestone II approval the Air Force will enter the next phase, referred to as EMD Phase 2, which involves building full scale hardware, integration and flight testing on the designated aircraft to carry JDAMs, and approval to enter Low Rate Initial Production.</p> <p>Management: The Air Force Program Executive Officer for Conventional Strike Systems (AFPEO/TS) is responsible for executing the JDAM program as part of his overall portfolio of acquisition programs. The JDAM Program Director, located at Eglin AFB, FL, is responsible for contracting and managing the development efforts under the broad guidance of the PEO. The Air Force program office draws additional support from the Aeronautical Systems Center, the Air Force Development Test Center, the Naval Air Systems Command, the Naval Air Warfare Center, and other Government agencies. There are three noteworthy aspects to how the Air Force will manage the JDAM program: (1) The aircraft program offices have the responsibility to budget for incorporation of JDAM capability on their respective production aircraft. (2) JDAM is using the MIL-PRIME acquisition approach that the Advanced Tactical Fighter Program pioneered. MIL-PRIME allows the contractor to tailor the work effort using the tasks and schedules that he feels are most appropriate for him under the broad schedule provided by the program office. (3) The Air Force is using a small, streamlined program office and Integrated Product Teams to manage JDAM. Program office size is approximately 30 per cent less than comparable Air Force programs. Also, with statutory relief from the Congress, JDAM is able to apply commercial practices in the program.</p> <p>Contracting: The Air Force selected two contractors for Phase 1 in a free and open competition among domestic sources. The primary purposes for competition during Phase 1 are to have an environment conducive to aggressive production cost reduction and to give the Government a contractor performance benchmark to help choose the best contractor for the program. After approximately 18 months the Air Force will downselect from two contractors to build hardware for developmental and operational test.</p>			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY		DATE	
#5 - Engineering and Manufacturing Development		February 1995	
PE NUMBER AND TITLE		# 0604618 - Joint Direct Attack Munition (JDAM) 3890	
B. Program Change Summary (\$ in Thousands)			
Previous President's Budget	1994	1995	1997
Appropriated Value	87,822	84,995	106,746
Adjustments to Appropriated Value	75,422	67,583	
a. Cong General Reductions	-757	-744	
b. FY 94 Omnibus Cong Rpgm	-4,083		
c. Cong Notification Rpgm	-3,400		
d. Below Threshold Rpgm	-4,432		
e. SBIR	-858	-1,269	
Adjustments to Budget Years Since FY 95 PB			
Current Budget Submit/President's Budget	61,892	65,570	697,519
Change Summary Explanation:			
Funding: FY95: General Reductions (FFRDC, Non-FFRDC, University Research and Travel Reductions) (\$744)			
FY96&FY97: Funding decreases due to realignment of JDAM Product Improvement Program (PIP) and decreases in B-1B integration funding in FY96. Funds were added in FY96 to buy an additional 150 EMD assets.			
Schedule: None.			
Technical: None.			
Total Cost TBD			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY										PROJECT NO.	
#5 - Engineering and Manufacturing Development										# 0604618 - Joint Direct Attack Munition (JDAM) 3890	
C. Other Program Funding Summary (\$ in Thousands)											
Appropriation: Missile Procurement, Air Force, Budget Activity: 2 Other Missiles, Program Title: Joint Direct Attack Munition (JDAM)											
	1994	1995	1996	1997	1998	1999	2000	2001	To	Total	
\$									Compl	Cost	
QTY	0	0	0	0	64,547	66,404	154,160	249,580	2,639,055	3,173,746	
	0	0	0	0	700	855	2,622	4,770	53,013	62,000	
Appropriation: Weapons Procurement, Navy, Budget Activity: 5 GP Bombs, Program Title: Joint Direct Attack Munition (JDAM)											
	1994	1995	1996	1997	1998	1999	2000	2001	To	Total	
\$									Compl	Cost	
QTY	0	0	0	0	41,227	47,771	39,442	33,172	869,488	1,031,100	
	0	0	0	0	300	450	410	430	10,410	12,000	
Appropriation: RDT&E, Navy, Budget Activity: 5 Title: Joint Direct Attack Munition (JDAM)											
	1994	1995	1996	1997	1998	1999	2000	2001	To	Total	
\$									Compl	Cost	
	8,394	25,860	37,832	36,576	12,806	7,759	9,318	15,356	0	177,098	

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE		February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE		PROJECT NO.	
#5 - Engineering and Manufacturing Development		# 0604618F - Joint Direct Attack Munition (JDAM)		3890	
D. <u>Schedule Profile</u>					
		1994		1995	
		1	2	3	4
Milestone I		X			
Dem/Val Contract Award					
System Reqmts Review			X		
Preliminary Design Reviews			X		
Critical Design Review					
Production Readiness Review - 1					
Milestone II					
EMD Phase II Contract Option					
Operational Assessment					
Start					
Complete					
DT&E Flight Test Start					
IOT&E Start					
Production Readiness Review - 2					

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE # 0604618 - Joint Direct Attack Munition (JDAM) 3890	PROJECT NO.
#5 - Engineering and Manufacturing Development D. Schedule Profile (Cont.) Additional Major Program Events:		
Exercise LRIP-1 Option	FY98/Q1	
Milestone I - JDAM PIP	FY98/Q3	
Organic Support Capability	FY98/Q3	
Complete DT&E	FY98/Q4	
LRIP-2 Contract Award	FY99/Q1	
LRIP-1 First Delivery	FY99/Q2	
IOT&E Complete (2,000 lb kit)	FY99/Q2	
AUR Depot Spt Capability	FY99/Q3	
Milestone III	FY99/Q4	
Required Assets Avail.	TBD	
IOC	FY99/Q4	
Full Rate Prod Cont Award	FY00/Q1	
Component Depot Spt Cap	FY00/Q3	
OT&E Complete (1,000lb/F-22)	FY01/Q4	

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)									
BUDGET ACTIVITY		PE NUMBER AND TITLE				PROJECT NO.			
#5 - Engineering and Manufacturing Development		#0604618 - Joint Direct Attack Munition (JDAM)				3890			
A. Project Cost Breakdown (\$ in Thousands)									
Project Cost Categories									

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-3) EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY										PROJECT NO.	
#5 - Engineering and Manufacturing Development										# 0604618F - Joint Direct Attack Munition (JDAM) 3890	
B. Budget Acquisition History and Planning Information (\$ in Thousands)											
Performing Organizations:											
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
<u>Support and Management Organizations</u>											
TEAMS Contractor	CR	Various	3,916	3,916	628	824	958	626	438	442	3,916
Program Office	Various	Various	21,902	21,902	1,189	4,859	3,275	5,261	5,541	1,777	21,902
<u>Test and Evaluation Organizations</u>											
<u>Aircraft SPO/PMA Support</u>											
JDAM/F-16 OFF DT&E Tape	UNK	Jan-95	3,500	3,500			3,500				3,500
JDAM/F-16 Wpn Cmpat	UNK	Jul-93	1,160	1,160	700	460					1,160
JDAM/F-15 Wpn Cmpat	UNK	Sep-94	1,340	1,340		1,340					1,340
AFMSS	UNK	Sep-93	3,116	3,116	200		1,480	260	1,176		3,116
JDAM/B-1 OFF DT&E Tape	UNK	Jul-93	20,231	20,231	1,200		2,000		17,031		20,231
Group 2/3 A/C Testing	Various	Various	12,921	12,921	67				3,000	9,854	12,921
<u>Test and Evaluation Organizations</u>											
<u>Flight Testing</u>											
Test Wing Support	Various	Various	13,500	13,500	30	172	3,279	3,025	6,000	994	13,500
Systems Safety (AFDTC)	TBD	TBD	143	143			30	56	57		143
ASC/SK Support	Various	Various	431	431	26	33	150	222			431

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1995
BUDGET ACTIVITY			PE NUMBER AND TITLE					PROJECT NO.			
#5 - Engineering and Manufacturing Development			#0604618 - Joint Direct Attack Munition (JDAM)					3890			
B. Budget Acquisition History and Planning Information (\$ in Thousands)											
Performing Organizations:											
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
DT/OT Test	Various	Various	16,000	16,000					12,000	4,000	16,000
Ground Testing											
AEDC Support	CR	Sep-94	17,571	17,571		785	11,300		5,486		17,571
Container Testing	TBD	TBD	549	549				216	333		549
CIGTF	TBD	Feb-95	862	862			862				862
EMI Testing	TBD	Feb-95	2,750	2,750			750	2,000	0		2,750
DT Targets	TBD	Mar-95	3,000	3,000				1,000	2,000		3,000
Ground/Margin Testing	TBD	TBD	5,856	5,856					3,500	2,356	5,856
OPTEVFOR Support (Test)	TBD	TBD	240	240					120	120	240

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#5 - Engineering and Manufacturing Development		#0604618 - Joint Direct Attack Munition (JDAM)								3890	
B. Budget Acquisition History and Planning Information (\$ in Thousands)											
Performing Organizations:											
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
Government Furnished Property:											
Test and Evaluation Property											
Telemetry	FP	Oct-93	1,450	1,450	500	200	750				1,450
CFMRE	FP	Sep-93	94	94	94						94
BLU-109s & 100s	FP	Mar-93	1,509	1,509	1,385	24	100				1,509
KGv-68	TBD	Feb-95	250	250			250				250
Encryption	FP	Aug-94	30	30		30					30
FMU-143 Fuze	FP	Jun-94	72	72	72						72
MK-84 F/A-18 STVs	FP	Mar-93	1,162	1,162	227			935			1,162
Subtotal Product Development					15,040	53,165	36,886	78,560	29,225	351,088	563,964
Subtotal Support and Management					1,817	5,683	4,233	5,887	5,979	2,219	25,818
Subtotal Test and Evaluation					4,501	3,044	24,451	7,714	50,703	17,324	107,737
Total Project					21,358	61,892	65,570	92,161	85,907	370,631	697,519

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

5 - Engineering and Manufacturing Development

0604703F Aeromedical/Casualty Care Systems Development

COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	9,999	7,902	6,235	6,193	4,583	2,183	617	106	Cont	TBD
2866 Aeromedical/Casualty Care Systems Development	9,999	7,902	6,235	6,193	4,583	2,183	617	106	Cont	TBD

(U) A. Mission Description and Budget Item Justification

This program is under the research and development category which supports Engineering and Manufacturing Development (EMD) of systems for treatment, evacuation, and prediction of wartime casualties in a conventional or non-conventional warfare environment. Tactical, strategic, and covert aeromedical evacuation systems and medical treatment equipment are developed and fielded to meet unique Air Force medical readiness and operational requirements.

(U) FY 1994 (\$ in Thousands)

- (U) Civil Reserve Air Fleet Aeromedical Evacuation Shipsets (CRAF AESS) - Re-packaged shipsets and rewrote technical manuals. (\$21) (4QFY94)
- (U) Transportable Blood Transshipment Center (TBTC) - conducted system critical design review (1QFY94), Development Test and Evaluation (DT&E), and Government procedures evaluation (Jun 94). (\$3,633) (3QFY94)
- (U) Chemically Hardened Air Transportable Hospital/Chemically Hardened Air Management Plant (CHATH/CHAMP) - awarded contract and conducted Functional Configuration Audit for CHAMP prototype. (\$2,484) (1QFY94)
- (U) Threat Related Attrition (THREAT) - initiated system integration for Build 1 and design for ground attack module for Build 2. (\$911) (3QFY94)
- (U) Alternating Current Interface Unit (ACIU) - conducted test and evaluation. (\$45) (4QFY94)
- (U) Aeromedical Systems Analysis - Conducted foundation studies and analyses to support core aeromedical and casualty care requirement. (\$260) (continuing)
- (U) Fund proportional efforts of Human Systems Center (HSC), System Program Office (SPO), and Technical Engineering and Management Support (TEAMS) contractor. (\$2,645) (4QFY94)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE
BUDGET ACTIVITY		
5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE	February 1995
0604703F Aeromedical/Casualty Care Systems Development		
(U) A. Mission Description and Budget Item Justification (Continued)		
(U) EY 1995 (\$ in Thousands)		
- (U)	Transportable Blood Transshipment Center (TBTC) - conduct Functional Configuration Audit and Initial Production Readiness Review (1QFY95), complete Operational Test and Evaluation (OT&E) (2QFY95), make Milestone III decision, initiate production (3QFY95), meet Initial Operating Capability. (\$352) (4QFY95)	
- (U)	Spinal Cord Injury Transport System (SCITS) - award EMD contract. (\$414) (4QFY95)	
- (U)	Threat Related Attrition (THREAT) - complete integration testing for Build 1 (3QFY95), meet Initial Operating Capability (4QFY95), and test the ground attack module for Build 2. (\$708) (4QFY95)	
- (U)	Wartime Medical Planning System (WAR-MED PS) - make Milestone II decision. (\$51) (3 QFY 95)	
- (U)	Alternating Current Interface Unit (ACIU) - make Milestone III decision and award production contract. (\$30) (3 QFY 95)	
- (U)	Continuous/Intermittent Suction Unit (CISU) - make Milestone II decision and release draft Request for Proposal. (\$117) (2 QFY 95)	
- (U)	Civil Reserve Air Fleet Aeromedical Evacuation Shipset (CRAF AESS) - complete re-packaging of shipsets (1 QFY 95), meet FOC. (\$11) (4QFY95)	
- (U)	Chemically/Biologically Hardened Air Transportable Hospital/Chemically/Biologically Hardened Air Management Plant (CHATH/CHAMP) - deliver 2 prototypes (1QFY95), down select best design, exercise EMD option. (\$3,365) (3 QFY 95)	
- (U)	Aeromedical Systems Analyses - conduct foundation studies and analyses to support core aeromedical and casualty care requirement. (\$1,452) (Continuing)	
- (U)	Fund proportional efforts of Human Systems Center (HSC), System Program Office (SPO), and Technical Engineering and Management Support (TEAMS) contractor. (\$1,402)	
(U) EY 1996 (\$ in Thousands)		
- (U)	TBTC - deliver initial production units. (NSP) (4QFY96)	
- (U)	SCITS - complete Critical Design Review. (\$854) (4QFY96)	
- (U)	THREAT - integrate ground attack model for Build 2 and complete integration testing (4QFY96), deliver Build 2 (4QFY96), develop Nuclear, Biological, and Chemical models. (\$1,068) (4QFY96)	
- (U)	WAR-MED PS - award EMD contract (3QFY96), begin casualty care models integration. (\$957) (4QFY96)	
- (U)	CISU - award EMD contract (1QFY96), test developmental prototype. (\$1,542) (2QFY96)	

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE
BUDGET ACTIVITY	PE NUMBER AND TITLE	February 1995
5 - Engineering and Manufacturing Development	0604703F Aeromedical/Casualty Care Systems Development	
<p>(U) A. Mission Description and Budget Item Justification (Continued)</p> <p>(U) FY 1996 (\$ in Thousands) (Continued)</p> <ul style="list-style-type: none"> - (U) Alternating Current Interface Unit (ACIU) - complete production. (\$22) (4QFY96) - (U) Chemically/Biologically Hardened Air Transportable Hospital/Chemically/Biologically Hardened Air Management Plant (CHATH/CHAMP) - complete CHAMP Development Test and Evaluation (3QFY96), complete CHAMP Operational Test and Evaluation, make Milestone III decision, and exercise production option. (\$1,205) (4QFY96) - (U) Aeromedical Systems Analyses - conduct foundation studies and analyses to support core aeromedical and casualty care requirements. (\$191) (Continuing) - (U) Fund proportional efforts of Human Systems Center (HSC), System Program Office (SPO), and Technical Engineering and Management Support (TEAMS) contractor. (\$396) (4QFY96) <p>(U) FY 1997 (\$ in Thousands)</p> <ul style="list-style-type: none"> - (U) Transportable Blood Transshipment Center (TBTC) - deliver final production units, meet Full Operational Capability. (NSP) (4QFY97) - (U) CHATH/CHAMP - Initiate production of 30 CHATH/CHAMP systems, meet Initial Operational Capability (IOC). (\$125) (1QFY97) - (U) Spinal Cord Injury Transport System (SCITS) - complete Design Test and Evaluation (3 QFY 97), complete System Verification Review. (\$1,494) (4QFY97) - (U) Threat Related Attrition (THREAT) - integrate Nuclear, Biological, and Chemical models for Build 3 and complete integration testing (3 QFY 97), deliver Build 3. (\$696) (4QFY97) - (U) Wartime Medical Planning System (WAR-MED PS) - complete Critical Design Review (3 QFY 97), meet IOC and complete design of Fifth Echelon Model. (\$1,771) (4QFY97) - (U) Continuous/Intermittent Suction Unit (CISU) - conduct Operational Test and Evaluation meet IOC, complete EMD (2 QFY 97), make Milestone III decision (3QFY97), and exercise production option. (\$960) (3 QFY 97) - (U) Aeromedical Systems Analyses - conduct foundation studies and analyses to support core aeromedical and casualty care requirements. (\$752) (Continuing) - (U) Fund proportional efforts of HSC, SPO, and TEAMS contractor. (\$395) (4QFY97) 		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE
BUDGET ACTIVITY	PE NUMBER AND TITLE	February 1995
5 - Engineering and Manufacturing Development	0604703F Aeromedical/Casualty Care Systems Development	
(U) B. <u>Program Change Summary (\$ in Thousands)</u>		
Previous President's Budget	1994	Total
Appropriated Value	10,260	Cost
Adjustments to Appropriated Value	10,260	Cont
a. General Congressional Reductions (GCR)	-103	
b. Below Threshold Reprogramming (BTR)	-41	
c. SBIR	-117	
Adjustments to Budget Years Since FY95 PB		
Current Budget Submit/President's Budget	9,999	
Change Summary Explanation:		
Funding: FY95 GCR reductions were for FFRDC, NON-FFRDC, university research, and travel. Reductions in FY96 and FY97 are due to revised inflation estimates.		
Schedule: None		
Technical: None		
(U) C. <u>Other Program Funding Summary (\$ in Thousands)</u>		
	1994	1995
Appropriation Other Procurement - AF, Budget Activity #4, Other Base and Maintenance Support, Program Title Medical/Dental Equipment	5,461	6,500
	10,921	7,655
	4,536	5,827
	3,000	0
	43,900	

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE _____

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

5 - Engineering and Manufacturing Development

0604703F Aeromedical/Casualty Care Systems Development 2866

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)									
BUDGET ACTIVITY					PE NUMBER AND TITLE				
5 - Engineering and Manufacturing Development					0604703F Aeromedical/Casualty Care Systems Development 2866				
(U) D. Schedule Profile (Continued)					PROJECT NO.				
					DATE				
					February 1995				

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)			DATE	PROJECT NO.
BUDGET ACTIVITY	PE NUMBER AND TITLE			
5 - Engineering and Manufacturing Development	0604703F Aeromedical/Casualty Care Systems Development		2866	
(U) A. Project Cost Breakdown (\$ in Thousands)				
Engineering and Manufacturing Development	1994	1995	1996	1997
Development/Operational Test and Evaluation	5,872	5,305	4,593	4,454
Contractor Engineering Support	869	574	0	98
Miscellaneous (System Program Office Operations)	857	1,199	1,041	1,040
Mission Support/Supplies	2,336	818	595	595
	65	6	6	6
Total	9,999	7,902	6,235	6,193

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)						DATE		February 1995			
BUDGET ACTIVITY				PE NUMBER AND TITLE				PROJECT NO.			
5 - Engineering and Manufacturing Development				0604703F Aeromedical/Casualty Care Systems Development				2866			
(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)											
Performing Organizations											
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
Product Development Organizations											
TBTC	CPAF/FFP	Mar 91	11,033		11,527	2,808	0	0	0	0	14,335
Arthur.D.Little (Terminated)											
CHATH Phase I	FPIF	Dec 94			0	1,684	0	0	0	0	1,684
EASI						943					943
Guild						741					741
CHATH Phase II							2512	951			3,463
EASI or Guild											
CISU	C/CPIF	Jan 95			0	0	0	1,198	760	0	1,958
Unknown	Unknown										
WARMED	CPAF	Nov 95			0	0	0	807	1,616	3,736	6,159
BDM											
THREAT	C/CPFF	Aug 94			0	758	550	906	528	42	2,784
BDM											
New Business					17,477	0	1,682	633	1,800	1,209	22,801
Unknown											
Miscellaneous					17,123	301	561	233	157	212	18,589

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

5 - Engineering and Manufacturing Development

0604703F Aeromedical/Casualty Care Systems Development 2866

(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)

Performing Organizations (Continued)

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
Support and Management Organizations											
TEAMS					2,354	857	1,199	1,072	898	1,759	8,139
ATJ						261	670	599	502	983	3,015
OPTECH					2,354	199	529	473	396	776	2,374
MTC					1,848	397	818	376	374	445	2,751
SPO Operations					361	2,620	6	6	6	18	6,481
Mission Support/Supplies						65					462
Test and Evaluation Organizations											
White Sands Missile Range						114	495				609
Aberdeen Proving Ground						401	38				439
Edgewood Arsenal						114					114
Natick Labs						138					138
SA-ALC, Kelly AFB						41					41
Armstrong Lab						8	8				16
Other/Unknown					138	90	33	53	54		368

Government Furnished Property: None.

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE					PROJECT NO.				
5 - Engineering and Manufacturing Development		0604703F Aeromedical/Casualty Care Systems Development					2866				
(U) B. Budget Acquisition History and Planning Information (\$ in Thousands) (Continued)											
Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program	
Subtotal Product Development				46,127	5,551	15,305	4,728	4,861	Cont	TBD	
Subtotal Support and Management				4,563	3,542	2,023	1,454	1,278	Cont	TBD	
Subtotal Test and Evaluation				138	906	574	53	54	Cont	TBD	
Total Project				50,828	9,999	7,902	6,235	6,193	Cont	TBD	

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE									
5, Engineering and Manufacturing Development		0604704F, Common Support Equipment Development									
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Total Program Element (PE) Cost	4551	1558	1167	613	421	330	0	0	0	52821	
Common SE Development/2479	2311	298	0	0	0	0	0	0	0	5601	
AF SE Management/3759	740	663	0	0	0	0	0	0	0	3967	
60,000 Pound Aircraft Loader/3852	1500	597	1167	613	421	330	0	0	0	43253	

A. Mission Description and Budget Item Justification

This program element supports projects that develop, test, evaluate and field improved flight line support equipment (SE) to meet the operational needs of both Global Reach and Global Power forces which can not be met through non-developmental item (NDI) acquisitions. Its goal is to limit proliferation; increase standardization; reduce the deployment footprint; and improve performance, availability, and reliability and maintainability; thereby reducing life cycle costs. Common SE is needed to minimize the operational and support burden imposed by the proliferation of weapon systems unique SE. Common SE efforts reduce SE proliferation, assure maximum operational capability for the dollars invested, and reduce the SE burden for operational commands and supporting agencies. This program element supports the development of an air transportable, transporter-type loader with the capability to accommodate six pallets or a Type V airdrop platform carrying 60,000 pounds in a single load. It will be the backbone of the Global Reach airlift 463L system and improve mobility deployment times for the present military and Civil Reserve Air Fleet (CRAF) as well as the C-17 aircraft. This program element is assigned to the Engineering and Manufacturing Development (EMD) budget activity because the majority of the funded effort focuses on preparing for production.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)				DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE				
5, Engineering and Manufacturing Development	0604704F, Common Support Equipment Development				
B. Program Change Summary (\$ in Thousands)					
Previous President's Budget	1994	1995	1996	1997	Total
Appropriated Value	4766	1605	1874	1306	Cost
Adjustments to Appropriated Value	4793	1605			9551
a. Congressional General Reduction	-27	-17			
b. SBIR	-55	-30			
c. Below Threshold Reprogramming	-160				
Adjustments to Budget Years Since FY95 PB			-707	-693	-1400
Current Budget Submit/President's Budget	4551	1558	1167	613	7889
Change Summary Explanation: FY94 funds reduced for Congressional Reduction, SBIR, and BTR. FY95 funds reduced by General Reduction and SBIR. The Advanced X-ray Equipment System (AXES), within project #2479, will be terminated in FY95 after completion of acquisition phase II. The Air Force Support Equipment Management (AFSEM) project #3759 transferred to PE 0708611 beginning in FY96. Also, the AFSEM project was restructured resulting in a 30% reduction in FY96 and FY97 funds.					
C. Other Program Funding Summary (\$ in Thousands)					
	1994	1995	1996	1997	1998
Appropriation: Other Procurement, AF (Budget Activity: 82)					
60K A/C Loader	27680	29475	35336	36901	29029
				36530	36355
				38238	Cont
D. Schedule Profile: See each project.					TBD

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

5, Engineering and Manufacturing Development

0604704F, Common Support Equipment Development, 2479

COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
	2311	298	0	0	0	0	0	0	0	5601

A. Mission Description and Budget Item Justification

Project 652479, Common Support Equipment: This project develops and tests common SE to fill a continuing need for better combat effectiveness, lower life cycle costs, and increased SE standardization. The Advanced X-ray Equipment System (AXES) task will develop a rugged deployable, high resolution x-ray system. It integrates state-of-the-art x-ray technology for organizational level nondestructive inspection of structural flaws, foreign substances, and corrosion in inaccessible or otherwise undetected components of aircraft, engines, and missiles. This task will be terminated after completion of IOT&E and Acquisition Phase II.

(U) FY 1994

- (U) Completed design qualification part of Design Test and Evaluation (DT&E) on AXES - \$40
- (U) Conducted Initial Operational Test and Evaluation (IOT&E) on AXES - \$10
- (U) Conducted Functional Configuration Audit (FCA) on AXES - \$10
- (U) Continued engineering, technical assistance, and program management support for AXES - \$267
- (U) Supported development of SE software standards - \$1836
- (U) Analytic Support Contract - \$148

(U) FY 1995

- (U) Complete acquisition phase II and terminate the AXES program - \$298

(U) FY 1996 Not Applicable(U) FY 1997 Not Applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE _____

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

5, Engineering and Manufacturing Development

0604704F, Common Support Equipment Development, 2479

B. Program Change Summary (\$ in Thousands)

<u>B. Program Change Summary (in thousands)</u>					
	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>	Total
Previous President's Budget	2666	304	153	103	Cost 3226
Appropriated Value	2666	304			
Adjustments to Appropriated Value					
a. Congressional General Reduction	-27	-6			
b. SBIR	-55				
c. Below Threshold Reprogramming	-273		-153	-103	-256
Adjustments to Budget Years Since FY95 PB					
Current Budget Submit/President's Budget	2311	298	0	0	2609

Change Summary Explanation: FY94 funds reduced for Congressional Reduction, SBIR, BTR, and realignment. FY 95 funds reduced for SBIR. FY96 and FY97 funds were realigned to the 60K A/C Loader project from the Advanced X-ray Equipment System (AXES) project. The AXES project will be terminated in FY95 after completion of acquisition phase II.

C. Other Program Funding Summary (\$ in Thousands): Not Applicable.

D. Schedule Profile

<u>D. Schedule Profile</u>												
	<u>1994</u>				<u>1995</u>		<u>1996</u>		<u>1997</u>			
	1	2	3	4	1	2	3	4	1	2	3	4
* Start/Complete IOT&E				X								
* Complete Acquisition Phase II ; Terminate the Acquisition Program					X							

* Start/Complete IoT&E

* Complete Acquisition Phase II

Terminate the Acquisition Program

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	PROJECT NO.
BUDGET ACTIVITY	PE NUMBER AND TITLE		
5, Engineering and Manufacturing Development	0604704F, Common Support Equipment Development, 2479		
A. <u>Project Cost Breakdown (\$ in Thousands)</u>			
Development Contract	1994 1995 1996 1997		
Development Test and Evaluation	10		
Initial Operational Test and Evaluation	40		
Engineering and Program Management Support	10		
Support Equipment Software Standards Development	267 298		
Analytic Support Contract	1836		
	148		
Total	2311 298		
B. <u>Budget Acquisition History and Planning Information:</u> Not Applicable.			
C. <u>Funding Profile:</u> Not Applicable.			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)							DATE		February 1995		
BUDGET ACTIVITY		PE NUMBER AND TITLE					PROJECT NO.				
5, Engineering and Manufacturing Development		0604704F, Common Support Equipment Development, 3759									
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
	740	663	0	0	0	0	0	0	0	3967	
<p>A. <u>Mission Description and Budget Item Justification</u></p> <p>Project 653759, Air Force Support Equipment Management: The Automatic Test Systems (ATS) Product Group Manager (PGM) Product Master Plan (PMP) and ATS Database development effort is designed to give the ATS PGM the tools to track and plan Air Force ATS direction. The PMP will support standardization and ATS PGM long-term planning by capturing essential data on all Air Force ATS. The Database will include all ATS identified in the PMP and be used to interface with Integrated Weapon System Master Plans. The ATS Database will also include the ATS Preferred Item List (PIL). It will provide ATS users and managers the capability to match new test requirements to existing test capabilities and ATS developments. This project will be transferred to PE 0708611F beginning in FY96.</p> <p>(U) <u>FY 1994</u></p> <ul style="list-style-type: none"> - (U) Continued development of Automatic Test Systems (ATS) Master Plans - \$415 - (U) Develop the Air Force ATS Preferred Item List (PIL) - \$40 - (U) Program the database and collect parametric data on the ATS PIL - \$245 - (U) Program management support - \$40 <p>(U) <u>FY 1995</u></p> <ul style="list-style-type: none"> - (U) Complete development of the ATS Master Plans - \$430 - (U) Continue ATS Product Master Plan (PMP) data maintenance - \$10 - (U) Program upgrades to the ATS Database - \$30 - (U) Update and maintain ATS PIL Database - \$147 - (U) Program management support - \$46 <p>(U) <u>FY 1996 Not Applicable</u></p> <p>(U) <u>FY 1997 Not Applicable</u></p>											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE	PROJECT NO.
5, Engineering and Manufacturing Development		0604704F, Common Support Equipment Development, 3759	
B. Program Change Summary (\$ in Thousands)			
Previous President's Budget	1994	1995	1996
Appropriated Value	700	693	701
Adjustments to Appropriated Value	700	693	701
a. Congressional General Reductions		-17	
b. SBIR		-13	
c. Below Threshold Reprogramming	+40		
Adjustments to Budget Years Since FY95 PB			-701
Current Budget Submit/President's Budget	740	663	0
			0
			-689
			-1390
			1403
Total Cost 2783			
Change Summary Explanation: FY94 funds increased, through a realignment, for program management support. FY95 funds reduced by a General Reduction and SBIR. The Air Force Support Equipment Management (AFSEM) project and funding transferred to PE 0708611F beginning in FY96. Also, the AFSEM project was restructured resulting in a 30% reduction in FY96 and FY97 funds.			
C. Other Program Funding Summary (\$ in Thousands): Not Applicable.			
D. Schedule Profile: Not Applicable.			

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
5, Engineering and Manufacturing Development	0604704F, Common Support Equipment Development, 3759		
A. <u>Project Cost Breakdown (\$ in Thousands)</u>			
Development ATS Master Plan	1994 1995 1996 1997		
Development ATS PIL database	415 430		
Update ATS database	285 147		
ATS Product Line Master Plan data maintenance	30		
Program management support	10		
Total	40 46		
	740 663		
B. <u>Budget Acquisition History and Planning Information:</u> Not Applicable.			
C. <u>Funding Profile:</u> Not Applicable.			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)								DATE		February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE						PROJECT NO.			
5, Engineering and Manufacturing Development		0604704F, Common Support Equipment Development, 3852									
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
	1500	597	1167	613	421	330	0	0	0	43253	
<p>A. Mission Description and Budget Item Justification</p> <p>Project 653852, 60,000 (60K) Pound Capacity Aircraft Transporter Loader: This project completes the development of the 60,000 pound capacity aircraft transporter/loader to fulfill the requirement of Air Mobility Command's (AMC's) Operational Requirements Document (ORD) 002-89-1. The project provides a single, unique loader to on/off load various aircraft like the C-17, C-5, C-141, C-130, C-27, KC-10, and Civil Reserve Air Fleet (CRAF) aircraft while combining the capabilities of the 40K, wide-body elevator, and lower-lobe loaders. The 60K loader will be driven on/off of the C-17, C-5, and C-141 aircraft without shoring and will be the only loading vehicle capable of moving a type V airdrop platform carrying a full 60,000 pounds required by the US Army. The 60K loader will be significantly more reliable with a 100 hours mean time between failure (MTBF) versus the 40K loader's 18 hours MTBF. Major reductions from 30 man-hours to 3 man-hours in deployment preparation times will be made.</p> <p>(U) FY 1994</p> <ul style="list-style-type: none"> - (U) Materials and labor for Engineering Change Order (ECO) testing on prototype loaders - \$860 - (U) Researched Engineering Change Proposals (ECPs) - \$80 - (U) Provided contracted advisory and assistance services and program management support - \$560 <p>(U) FY 1995</p> <ul style="list-style-type: none"> - (U) Materials and labor for ECO testing on prototype loaders - \$60 - (U) Researched ECPs - \$60 - (U) Continue contracted advisory and assistance services and program management support - \$477 <p>(U) FY 1996</p> <ul style="list-style-type: none"> - (U) Technical support for Initial Operational Test and Evaluation (IOT&E) - \$540 - (U) Research ECPs - \$80 - (U) Continue contracted advisory and assistance services and program management support - \$547 <p>(U) FY 1997</p> <ul style="list-style-type: none"> - (U) Research ECPs - \$44 - (U) Continue contracted advisory and assistance services and program management support - \$569 											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE		PROJECT NO.
5, Engineering and Manufacturing Development			
0604704F, Common Support Equipment Development, 3852			
B. Program Change Summary (\$ in Thousands)			
Previous President's Budget	1994	1995	1996
Appropriated Value	1400	608	1020
Adjustments to Appropriated Value	1400	608	
a. SBIR		-11	
b. Below Threshold Reprogramming	+100		
Adjustments to Budget Years Since FY95 PB			+147
Current Budget Submit/President's Budget	1500	597	1167
Change Summary Explanation: FY94 funds increased by a realignment for program management support. FY95 funds reduced for SBIR. FY96 and FY97 funds increased by a realignment for program management support and IOT&E.			
C. Other Program Funding Summary (\$ in Thousands)			
Appropriation: Other Procurement, AF (Budget Activity: 82)	1994	1995	1996
60K A/C Loader	27680	29475	35336
			36901
		29029	36530
			36355
			38238
			Cont
			TBD

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)									
BUDGET ACTIVITY								DATE	February 1995
PE NUMBER AND TITLE								PROJECT NO.	
5, Engineering and Manufacturing Development								0604704F, Common Support Equipment Development, 3852	
D. <u>Schedule Profile</u>									

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	PROJECT NO.																														
BUDGET ACTIVITY	PE NUMBER AND TITLE																																
5, Engineering and Manufacturing Development	0604704F, Common Support Equipment Development, 3852																																
<p>A. <u>Project Cost Breakdown (\$ in Thousands)</u></p> <table border="1"> <thead> <tr> <th></th> <th>1994</th> <th>1995</th> <th>1996</th> <th>1997</th> </tr> </thead> <tbody> <tr> <td>Materials and labor for ECO testing on prototype loaders</td> <td>860</td> <td>60</td> <td></td> <td></td> </tr> <tr> <td>Research ECPs</td> <td>80</td> <td>60</td> <td>80</td> <td>44</td> </tr> <tr> <td>Advisory and assistance services and program management support</td> <td>560</td> <td>477</td> <td>547</td> <td>569</td> </tr> <tr> <td>IOT&E</td> <td></td> <td></td> <td>540</td> <td></td> </tr> <tr> <td>Total</td> <td>1500</td> <td>597</td> <td>1167</td> <td>613</td> </tr> </tbody> </table> <p>B. <u>Budget Acquisition History and Planning Information</u>: Not Applicable.</p> <p>C. <u>Funding Profile</u>: Not Applicable.</p>					1994	1995	1996	1997	Materials and labor for ECO testing on prototype loaders	860	60			Research ECPs	80	60	80	44	Advisory and assistance services and program management support	560	477	547	569	IOT&E			540		Total	1500	597	1167	613
	1994	1995	1996	1997																													
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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY										DATE
PE NUMBER AND TITLE										February 1995
#5 - Engineering and Manufacturing Development										PE: #0604706 Life Support Systems
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	10,749	4,875	4,035	3,983	3,976	4,075	4,197	4,321	Continuing	TBD
Proj 3111 Aircraft Mishap Prevention Program	2,985	169	0	0	0	0	0	0	0	TBD
Proj 3812 COMBAT EDGE	649	762	0	0	0	0	0	0	0	TBD
Proj 412A Life Support Systems	7,115	3,944	4,035	3,983	3,976	4,075	4,197	4,321	Continuing	TBD
<p>A. (U) Mission Description and Budget Item Justification</p> <p>This program element is devoted to Engineering and Manufacturing Development (EMD) of aircrew life support equipment. This program element is managed from pre-concept to disposal under the Integrated Weapon System Management (IWSM) single manager concept. The Life Support program provides consolidated management for the development, acquisition, production, deployment and support of protective equipment and aircraft subsystems that enable aircrews, passengers, and ground support personnel to operate safely in combat and training environments. Equipment developed under this program is generally classified as Operational Environment life support systems, Escape and Descent systems, or Survival and Recovery systems. The majority of the equipment has been developed through the continuing core project, Project 412A, which provides centralized management of life support items and subsystems such as flight clothing, flight helmets, oxygen breathing equipment for aviators, anti-G coveralls, survival radios, night vision devices, active/passive noise reduction devices, parachute releases and aircraft ejection seats. Project 3111 develops a management information system to reduce loss of aircrew lives and aircraft due to human factors. Project 3812 develops a pressure breathing for G system for F-15 and F-16 crew members to help reduce the likelihood of G-induced loss of consciousness incidents and increase pilot endurance under high-G combat conditions. Acquisition strategy is incorporated at the project level.</p>										

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY				PE NUMBER AND TITLE						PROJECT NO.			
#5 - Engineering and Manufacturing Development				PE: #0604706 Life Support Systems						3111			
COST (\$ in Thousands)		FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost		
Proj 3111 Aircraft Mishap Prevention Program (AMPP)		2,985	169	0	0	0	0	0	0	0	15,617		
<p>A. (U) <u>Mission Description and Budget Item Justification</u></p> <p>Project 3111 develops a management information system to reduce loss of aircrew lives and aircraft due to human factors. This is a centralized system for the Air Force Safety Agency (AFSA) to analyze the human factor elements in aircraft mishaps. The results will assist the Air Force in the reduction of aircraft mishaps and the loss of human life. The systems was delivered to the AFSA at the end of FY94, completing the work under this project. The prime contractor for AMPP was ETA Technologies Corp. Acquisition was through Firm Fixed Price/Fixed Incentive contract.</p> <p>(U) <u>FY 1994</u></p> <ul style="list-style-type: none"> - (U) Conducted Test Readiness Review. (\$200) - (U) Complete Development Test And Evaluation. (\$1,400) - (U) Perform System configuration and physical configuration audits. (\$28) - (U) Conduct Analyst training. (\$150) - (U) Support AFSA system introduction. (\$1,207) <p>(U) <u>FY 1995</u></p> <ul style="list-style-type: none"> - (U) Program support to AFSA for initial AMPP operations. (\$169) <p>(U) <u>FY 1996</u> Not Applicable</p> <p>(U) <u>FY 1997</u> Not Applicable</p>													

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BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	PROJECT NO.																																																																																																																		
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<p>B. (U) Program Change Summary (\$ in Thousands)</p> <table border="1"> <thead> <tr> <th></th> <th>1994</th> <th>1995</th> <th>1996</th> <th>1997</th> <th>Total Cost</th> </tr> </thead> <tbody> <tr> <td>Previous President's Budget</td> <td>764</td> <td>0</td> <td>0</td> <td>0</td> <td>16,380</td> </tr> <tr> <td>Appropriated Value</td> <td>764</td> <td>0</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Adjustments to Appropriated Value</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Below Threshold Reprogramming</td> <td>2221</td> <td>169</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Current Budget Submit/President's Budget</td> <td>2,985</td> <td>169</td> <td>0</td> <td>0</td> <td>15,617</td> </tr> </tbody> </table> <p>Change Summary Explanation: Funding: FY94 and FY95 RDT&E Below Threshold Reprogramming to complete the Aircraft Mishap Prevention Project.</p> <p>Schedule: No Changes</p> <p>Technical: No Changes</p> <p>C. (U) Other Program Funding Summary (\$ in Thousands) Not Applicable</p> <p>D. (U) Schedule Profile</p> <table border="1"> <thead> <tr> <th></th> <th colspan="3">1994</th> <th colspan="3">1995</th> <th colspan="3">1996</th> <th colspan="3">1997</th> </tr> <tr> <th></th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> </tr> </thead> <tbody> <tr> <td>- Conducted Test and Readiness Review</td> <td></td> <td></td> <td></td> <td>*</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>- Delivered AMPP system to Air Force Safety Agency (AFSA)</td> <td></td> <td></td> <td></td> <td>*</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>* = Completed Effort</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>X = Start of Effort</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>					1994	1995	1996	1997	Total Cost	Previous President's Budget	764	0	0	0	16,380	Appropriated Value	764	0				Adjustments to Appropriated Value						Below Threshold Reprogramming	2221	169				Current Budget Submit/President's Budget	2,985	169	0	0	15,617		1994			1995			1996			1997				1	2	3	4	1	2	3	4	1	2	3	4	- Conducted Test and Readiness Review				*									- Delivered AMPP system to Air Force Safety Agency (AFSA)				*									* = Completed Effort													X = Start of Effort												
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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.			
#5 - Engineering and Manufacturing Development		PE: #0604706 Life Support Systems								3812			
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost			
Proj 3812 COMBAT EDGE	649	762	0	0	0	0	0	0	0	14,988			
<p>A. (U) <u>Mission Description and Budget Item Justification</u></p> <p>This project develops and fields a positive pressure breathing G system for F-15 and F-16 crew members, called the Combined Advanced Technology Enhanced Design "G" Ensemble (COMBAT EDGE). This system is designed to reduce the cumulative effects of G-induced stress and fatigue and thus reduce the number of G-induced Loss Of Consciousness (G-LOC) incidents. The system supplements the current anti-G suit garment with an upper torso counter pressure vest, a tensioning bladder modification kit incorporated into the current HGU-55/P helmet, a new oxygen mask, a modified oxygen regulator and a modified high-flow anti-G valve. For COMBAT EDGE, Gentex Corporation and Carleton Technologies are the prime contractors.</p> <p>(U) <u>FY 1994 Program</u></p> <ul style="list-style-type: none"> - (U) Conducted manrating on mask improvements (field of view and valsalva). (\$86) - (U) Completed Follow-on Test and Evaluation (FOT&E) on the HGU-55/P helmet modification kit. (\$130) - (U) Conducted FOT&E on mask improvements (field of view and valsalva). (NSP) - (U) Continued deployment of COMBAT EDGE to F-16 Air National Guard (ANG), Air Force Reserve (AFRES), and remaining active units. (\$433) <p>(U) <u>FY 1995 Program</u></p> <ul style="list-style-type: none"> - (U) Complete the deployment of COMBAT EDGE to ANG and Active F-16 units. (\$162) - (U) Conduct manrating on mask improvements (comfort and design). (\$80) - (U) Initiate FOT&E on mask improvements (comfort and design). (\$120) - (U) Initiate deployment of COMBAT EDGE system to F-15 units. (\$400) <p>(U) <u>FY 1996 Planned Program</u> - N/A</p>													

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	PROJECT NO.
BUDGET ACTIVITY	PE NUMBER AND TITLE		
#5 - Engineering and Manufacturing Development	PE: #0604706 Life Support Systems		February 1995 3812
A. (U) Mission Description and Budget Item Justification (Cont.)			
(U) FY 1997 Planned Program Not Applicable			
B. (U) Program Change Summary (\$ in Thousands)			
	1994	1995	1996
Previous President's Budget	249	80	0
Appropriated Value	249	80	0
Adjustments to Appropriated Value			
a. Below Threshold Reprogramming	400	682	
Current Budget Submit/President's Budget	649	762	0
			Total Cost 13,906
Change Summary Explanation:			
Funding: FY94 and FY95 Below Threshold Reprogrammings for deployment of COMBAT EDGE to F-15 units.			
Schedule: No changes			
Technical: No Changes			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE February 1995																																																																																												
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	1994			1995			1996			1997																																																																																												
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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY				PE NUMBER AND TITLE						PROJECT NO.			
#5 - Engineering and Manufacturing Development				PE: #0604706 Life Support Systems						412A			
COST (\$ in Thousands)		FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost		
Proj. 412A Life Support Systems		7,115	3,944	4,035	3,983	3,976	4,075	4,197	4,321	Continuing	TBD		
<p>A. (U) <u>Mission Description and Budget Item Justification</u></p> <p>Provides for Engineering, Manufacturing and Development (EMD) of life support equipment and subsystems to satisfy operational command requirements for improved life support equipment to maximize life support items and subsystems such as flight clothing, flight helmets, oxygen breathing equipment for aviators, anti-G coveralls, survival radios, night vision devices, active/passive noise reduction devices, parachute releases, and aircraft ejection seats. Program management support includes tasks to assess deficiencies of currently fielded equipment, to aid in transitioning new technology into EMD, and to support all current life support projects. Life Support Systems top three major contractors are: ITT Electro-Optical Products Division, Bose Corporation, and Conax Florida Corp. Life Support efforts result from full and open competition among qualified vendors to select a single primary source for EMD and follow-on production.</p> <p>(U) <u>FY 1994 Program</u></p> <ul style="list-style-type: none"> - (U) Completed Night Vision System (NVS) preliminary design phase. (\$2,440) - (U) Provided technical support to F-22 EMD program for life support equipment design and testing. (NSP) - (U) Completed NVS prototype development. (\$1,424) - (U) Completed NVS critical design phase. (\$2,786) - (U) Completed government assessment of prototype NVS systems. (\$114) - (U) Completed Active Noise Reduction (ANR) requirements definition for Air Force Special Operations Command (AFSOC). (\$168, AFSOC funded) - (U) Program Management Support. (\$351) 													

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	PROJECT NO.
BUDGET ACTIVITY	PE NUMBER AND TITLE		
#5 - Engineering and Manufacturing Development	PE: #0604706 Life Support Systems	February 1995	412A
<p>A. (U) Mission Description and Budget Item Justification (Cont.)</p> <p>(U) FY 1995 Program</p> <ul style="list-style-type: none"> - (U) Receive Night Vision System (NVS) Developmental Testing and Evaluation (DT&E) units. (\$3,231) - (U) Initiate NVS government conducted DT&E (\$521) - (U) Provide technical support for Universal Water Activated Release System (UWARS) production contract. (NSP) - (U) Initiate Active Noise Reduction (ANR) government DT&E. (\$643 Air Force Special Operations Command (AFSOC) funded) - (U) Complete UWARS government DT&E. (NSP) - (U) Complete UWARS Initial Operational Test & Evaluation (IOT&E). (Funded by PE64609F, R&M Maturation/Tech Insertion Program) - (U) Program Management Support. (\$192) <p>(U) FY 1996 Planned Program</p> <ul style="list-style-type: none"> - (U) Complete NVS contractor conducted qualification testing. (\$1,099) - (U) Start fabrication of NVS Initial Operational Testing and Evaluation (IOT&E) units. (\$1,886) - (U) Complete NVS government conducted Developmental Testing and Evaluation (DT&E). (\$834) - (U) Complete ANR government DT&E and IOT&E. (\$200, AFSOC funded) - (U) Deliver ANR production units. (\$1,386, AFSOC funded) - (U) Start UWARS production deliveries. (Funded under PE 27224F, Combat Rescue and Recovery) - (U) Program Management Support. (\$216) <p>(U) FY 1997 Planned Program</p> <ul style="list-style-type: none"> - (U) Receive NVS IOT&E units. (\$1,980) - (U) Complete government conducted NVS IOT&E. (\$1,842) - (U) Complete ANR production deliveries. (\$100, AFSOC funded) - (U) Complete UWARS production deliveries. (NSP) - (U) Program Management Support. (\$161) 			

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DT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)			DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.		
#5 - Engineering and Manufacturing Development	PE: #0604706 Life Support Systems	412A		
B. (U) Program Change Summary (\$ in Thousands)				
	1994	1995	1996	1997
Previous President's Budget	9,900	4,978	4,055	4,003
Appropriated Value	9,900	4,978		
Adjustments to Appropriated Value				
a. General Congressional Reduction		-89		
b. Below Threshold Reprogramming	-2,783	-851		
c. Small Buisness Innovative Research (SBIR)		-94		
Adjustments to Budget Years since FY95PB			-20	-20
Current Budget Submit/President's Budget	7,115	3,944	4,035	3,983
				TBD
Change Summary Explanation:				
Funding:	FY94 and FY95 Below Threshold Reprogramming to cover program priority requirements. FY95 Reduction for FFRDC, NON-FFRDC, travel, SBIR and university research. FY96 - FY97 RDT&E reduced for non-pay purchases inflation.			
Schedule:	No Changes			
Technical:	No Changes			
C. (U) Other Program Funding Summary (\$ in Thousands)	Not Applicable			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY		PE NUMBER AND TITLE												DATE	PROJECT NO.
#5 - Engineering and Manufacturing Development		PE: #0604706 Life Support Systems												February 1995	412A
		1994			1995			1996			1997				
		1	2	3	4	1	2	3	4	1	2	3	4		
D. (U)	<u>Schedule Profile</u>														
- Preliminary design phase Night Vision System (NVS)	*														
- Prototype development (NVS)	*														
- Completed Active Noise Reduction (ANR) Requirements Definitions	*														
- NVS Critical design phase	*														
- Government assessment of NVS prototype	*														
- Completed Universal Water Activated Release System (UWARS) Contractor Qual Test	*														
- Complete UWARS Government Developmental Testing and Evaluation (DT&E)															
- Complete UWARS Initial Operational Testing and Evaluation (IOT&E)															
- Receive NVS DT&E units															
- Complete NVS contractor Qualification testing.															
- Complete NVS DT&E															
- Complete ANR DT&E and IOT&E															
- Start UWARS Production Deliveries															
- Receive NVS IOT&E units ;															
- Complete ANR deliveries															
- Complete government conducted NVS IOT&E															
- Complete UWARS Production Deliveries															
* = Completed Effort															
X = Start of Effort															

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)			DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE		PROJECT NO.	
#5 - Engineering Manufacturing & Development	PE: #0604706 Life Support Systems		412A	
A. (U) <u>Project Cost Breakdown (\$ in Thousands)</u>				
	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>
<u>Total</u>	<u>7,115</u>	<u>3,944</u>	<u>4,035</u>	<u>3,983</u>
- Contract (Including Management Reserve)	6,289	3,231	2,442	3,251
- Technical engineering support	428	461	497	286
- Travel	168	151	177	132
- Government testing	47	60	880	285
- Program Management Support	183	41	39	29

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1995	PROJECT NO.
BUDGET ACTIVITY			PE NUMBER AND TITLE									
#5 - Engineering Manufacturing & Development			PE: #0604706 Life Support Systems							412A		
B. (U) Budget Acquisition History and Planning Information (\$ in Thousands)												
Performing Organizations:												
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program	
<u>Product Development Organizations</u>												
Kaiser Electronics C,CPAF		18 Jan 93	4,831		2,308	2,523	0	0	0	0	4,831	
ITT C,CPAF		18 Jan 93	15,397		2,628	3,766	3,231	2,442	3,251	79	15,397	
Other previous contracts												
<u>Support and Management Organizations</u>												
Program Management Support			1,137		845	183	41	39	29	Continuing	TBD	
Travel			929		301	168	151	177	132	Continuing	TBD	
System Engineering Technical Asst (SETA)			3,239		1,567	428	461	497	286	Continuing	TBD	
<u>Test and Evaluation Organizations</u>												
Air Force Flight Test Center			4,082		2,810	47	60	880	285	Continuing	TBD	
Subtotal Product Development			27,851		12,559	6,289	3,231	2,442	3,251	79	27,851	
Subtotal Support and Management ;			5,305		2,713	779	653	713	447	Continuing	TBD	
Subtotal Test and Evaluation			4,082		2,810	47	60	880	285	Continuing	TBD	
Total Project			37,238		18,082	7,115	3,944	4,035	3,983	Continuing	TBD	
Government Furnished Property: Not Applicable												

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

5 - Engineering And Manufacturing Development

0604708F Civil, Fire, Environment & Shelter Engrg

		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
	COST (In Thousands)										
	Total Program Element (PE) Cost	4,382	3,146	2,737	2,835	2,962	3,064	3,150	3,249	Continuing	Continuing
2054	Aerospace Facilities Engineering Development	739	665	663	739	768	797	821	845	Continuing	Continuing
2505	Aircraft Firefighting Suppression & Rescue	1,365	1,225	1,189	1,165	1,214	1,267	1,307	1,349	Continuing	Continuing
2674	Tactical Shelters	1,526	591	223	192	212	202	200	209	Continuing	Continuing
3788	Environmental Quality	752	665	662	739	768	798	822	846	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

This program funds the development, testing and evaluation of materials, equipment and procedures in four separate areas: a) Facilities Engineering improves the operational effectiveness, survivability, durability, and longevity of air base pavements, buildings and utilities; the overall objective is to provide an infrastructure that effectively supports the Air Force mission, contributes to high sortie rates, supports forward projection of air power, is less susceptible to damage from enemy actions or natural disasters, and is more rapidly returned to service if damaged. b) Fire Fighting Suppression and Rescue develops new concepts and technology applications to increase fire fighting support of combat operations, to improve base recovery after attack capabilities, and to reduce fire risks to personnel and resources. c) Tactical Shelters is the USAF portion of a tri service effort to develop standardized, low maintenance, survivable shelters and shelter accessories that are easily mobilized and compatible with air, sea and land transport systems. These products will effectively support high mobility aircraft support, command and control, communications, medical, and data processing units for the tactical and strategic forces. d) Environmental Quality ensures Air Force compliance with existing laws, executive orders, and Air Force policies by developing technologies to identify, reduce, and eliminate pollutant sources, identify and dispose of hazardous waste, conduct remediation, and mitigate the effects wastes and pollutants. This project develops equipment, materials, and processes in support of the Air Force environmental program. Environmental work performed under this program element is Engineering and Manufacturing Development because it takes basic technologies and develops them for Air Force use.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

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BUDGET ACTIVITY

PE NUMBER AND TITLE

5 - Engineering And Manufacturing Development

0604708F Civil, Fire, Environment & Shelter Engrg

(U) B. Program Change Summary (\$ in Thousands)

	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>	Total <u>Cost</u> Cont
(U) Previous President's Budget	4,433	3,214	2,950	3,030	
(U) Appropriated Value	4,433	3,214			
(U) Adjustment to Budget Years Since FY 95 PB			(213)	(195)	
(U) Adjustments to Appropriated Value					
a. Undistributed Congressional Reductions	(51)	(68)			
(U) Current Budget Submit/President's Budget	4,382	3,146	2,737	2,835	Cont

(U) Change Summary Explanation:

Funding: FY 96 and FY 97 programs adjusted for inflation and to cover higher priority requirements.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. Other Program Funding Summary (\$ in Thousands): Not Applicable.(U) D. Schedule Profile: Not Applicable.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE		February, 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT			
5 - Engineering And Manufacturing Development		0604708F Civil, Fire, Environment & Shelter Engrg								2054			
COST (In Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost		
2054	Aerospace Facilities Engineering Development	739	665	663	739	768	797	821	845	Continuing	Continuing		
<p>(U) A. Mission Description and Budget Item Justification Develops equipment, materials, and procedures to improve the operational effectiveness of aerospace facilities.</p> <ul style="list-style-type: none"> - (U) FY 1994 - (U) Continued development of new family of environmental control units, \$739,000. <p>(U) FY 1995</p> <ul style="list-style-type: none"> - (U) Complete development of new family of environmental control units, \$120,000. - (U) Begin Bare Base Systems requirements analysis, \$295,000. - (U) Begin development of new family of Bare Base shelters, \$160,000. - (U) Begin development of light weight deployable power generation/distribution systems, \$90,000. <p>(U) FY 1996</p> <ul style="list-style-type: none"> - (U) Complete Bare Base Systems requirements analysis, \$235,000. - (U) Continue development of new family of Bare Base shelters, \$233,000. - (U) Continue development of light weight deployable power generation/distribution systems, \$195,000. <p>(U) FY 1997</p> <ul style="list-style-type: none"> - (U) Continue development of new family of Bare Base shelters, \$405,000. - (U) Continue development of light weight deployable power generation/distribution systems, \$334,000. 													

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

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BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

5 - Engineering And Manufacturing Development

0604708F Civil, Fire, Environment & Shelter Engrg

2054

(U) B. Program Change Summary (\$ in Thousands)

	FY 1994	FY 1995	FY 1996	FY 1997	Total Cost Cont
(U) Previous President's Budget	739	665	666	743	
(U) Appropriated Value	739	665			
(U) Adjustments to Budget Years Since FY 95 PB			(3)	(4)	
(U) Adjustments to Appropriated Value					
(U) Current Budget Submit/President's Budget	739	665	663	739	Cont

(U) Change Summary Explanation:

Funding: FY 96 and FY 97 programs adjusted for inflation.

Schedule: Not Applicable

Technical: Not Applicable.

(U) C. Other Program Funding Summary (\$ in Thousands): Not Applicable.(U) D. Schedule Profile: Not Applicable.

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	PROJECT
BUDGET ACTIVITY	PE NUMBER AND TITLE				
5 - Engineering And Manufacturing Development	0604708F Civil, Fire, Environment & Shelter Engrg				2054
(U) A. <u>Project Cost Breakdown (\$ in Thousands)</u>					
	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>	
(U) New Family of Environmental Control Units	739	120			
(U) Bare Base Systems Analysis		295	235		
(U) New Family of Portable Shelters		160	233	405	
(U) Light Weight Deployable Generator		90	195	334	
(U) Total	739	665	663	739	
(U) B. <u>Budget Acquisition History and Planning Information (\$ in Thousands):</u> Not Applicable.					
(U) C. <u>Funding Profile (\$ in Thousands):</u> Not Applicable.					

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

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BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

5 - Engineering And Manufacturing Development

0604708F Civil, Fire, Environment & Shelter Engrg

2505

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
2505 Aircraft Firefighting Suppression & Rescue	1,365	1,225	1,189	1,165	1,214	1,267	1,307	1,349	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

Develops improved fire fighting, suppression and rescue equipment, materials, and methods to increase fire protection readiness, mobility, and effectiveness.

(U) FY 1994

- (U) Prepared for award of EMD contract for development of Deployable Fire Protection System (DFPS), \$265,000.
- (U) Continued development of Self Contained Breathing Apparatus (SCBA), \$178,000.
- (U) Continued courseware development of Firefighter Multimedia Training System (FMTS). Completes F-15, F-16, C-141, C-5, B-1. Began courseware development of firefighter physical fitness program, SCBA training, and procedures on CRAF aircraft, \$482,000.
- (U) Completed commercial technology exploitation for the nightscan telescoping fireground lighting system, hydrochem nozzle, Aqueous Film Forming Foam (AFFF)/dry chemical, compressed air foam system, and positive pressure ventilation on large frame aircraft, \$440,000.

(U) FY 1995

- (U) Award EMD contract for DFPS and begin support of production contract, \$550,000.
- (U) Continue courseware development for FMTS. Develop FMTS for structural, C-747, C-17 aircraft and HAZMAT I and II, \$250,000.
- (U) Continue commercial technology exploitation, \$350,000.
- (U) Begin development of fire fighter emergency response ensemble with body cooling system, \$45,000.
- (U) Complete development of SCBA, \$30,000.

(U) FY 1996

- (U) Continue courseware development of FMTS. Completes courseware for HAZMAT III, IV, and V, \$350,000.
- (U) Continue commercial technology exploitation, \$344,000.
- (U) Continue development of fire fighter emergency response ensemble with body cooling system, \$345,000.
- (U) Begin development of environmentally acceptable AFFF/Halon replacement, \$50,000.
- (U) Begin follow-on improvement of DFPS \$100,000.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	PROJECT
BUDGET ACTIVITY	PE NUMBER AND TITLE		
5 - Engineering And Manufacturing Development	0604708F Civil, Fire, Environment & Shelter Engrg	February, 1995	2505
(U) A: <u>Mission Description and Budget Item Justification Continued</u>			
(U) FY 1997			
- (U) Continue courseware development of FMTS, \$340,000.			
- (U) Continue commercial technology exploitation, \$270,000.			
- (U) Continue development of fire fighter emergency response ensemble with body cooling system, \$255,000.			
- (U) Continue development of environmentally acceptable AFFF/Halon replacement, \$200,000.			
- (U) Continue follow-on improvement of DFPS \$100,000.			
(U) B. <u>Program Change Summary (\$ in Thousands)</u>			
			Total
(U) Previous President's Budget	FY 1994	FY 1995	FY 1996
(U) Appropriated Value	1,365	1,293	1,295
(U) Adjustments to Budget Years Since FY 95 PB	1,365	1,293	1,271
(U) Adjustments to Appropriated Value			(106)
a. Undistributed Congressional Reductions		(68)	
(U) Current Budget Submit/President's Budget	1,365	1,225	1,189
			Cont
(U) Change Summary Explanation:			
Funding: FY 96 and FY 97 programs adjusted for inflation and to cover higher priority requirements.			
Schedule: Not Applicable.			
Technical: Not Applicable.			
(U) C. <u>Other Program Funding Summary (\$ in Thousands):</u> Not Applicable.			
(U) D. <u>Schedule Profile:</u> Not Applicable.			

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

5 - Engineering And Manufacturing Development

0604708F Civil, Fire, Environment & Shelter Engrg 2505

(U) A. Project Cost Breakdown (\$ in Thousands)

	FY 1994	FY 1995	FY 1996	FY 1997
(U) Deployable Fire Protection System	265	550	100	100
(U) Self Contained Breathing Apparatus	178	30		
(U) Firefighter Multimedia Training System	482	250	350	340
(U) Commercial Technology Exploitation	440	350	344	269
(U) Emergency Response Ensemble		45	345	256
(U) Halon/AFFF Agent Replacement			50	200
(U) Total	1,365	1,225	1,189	1,165

(U) B. Budget Acquisition History and Planning Information (\$ in Thousands): Not Applicable.(U) C. Funding Profile (\$ in Thousands): Not Applicable.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE February, 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
5 - Engineering And Manufacturing Development		0604708F Civil, Fire, Environment & Shelter Engrg								2674	
COST (In Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
2674	Tactical Shelters	1,526	591	223	192	212	202	200	209	Continuing	Continuing
<p>(U) A. <u>Mission Description and Budget Item Justification</u> Provides reliable, cost effective tactical shelters required to ensure the success of Air Force missions, provides Air Force membership in the DOD Tactical Shelter Program, and provides technology insertion for shelter development.</p> <p>(U) <u>FY 1994</u></p> <ul style="list-style-type: none"> - (U) Continued product improvement study for EMI on shelters, \$35,000. - (U) Continued the chemical and biological development program for shelters that use environmental control units, \$50,000. - (U) Continued the stylus electroplating control and materials selection protocol program for field application of EMI coatings, \$35,000. - (U) Began EMD phase of R-134a environmental control unit upgrade to non-ozone depleting chemicals, \$200,000. - (U) Developed new or modified shelter systems in conjunction with ASC/VXO to support the bare base development program, \$140,000. - (U) Continued Shelters 2000 program to develop new technologies for tactical shelters by the year 2000, \$275,000. - (U) Attended meetings of the Joint Committee for Tactical Shelters (JOCOTAS) and American Society for Testing and Materials (ASTM). Coordinate with other Air Force agencies. Fund ESC personnel, contractor support, MITRE support, travel, equipment, supplies, and overhead, \$791,000. <p>(U) <u>FY 1995</u></p> <ul style="list-style-type: none"> - (U) Complete EMD phase of R-134a environmental control unit upgrade to non-ozone depleting chemicals, \$200,000. - (U) Attend JOCOTAS and ASTM meetings. Coordinate with other Air Force agencies. Fund ESC personnel, contractor support, MITRE support, travel, equipment, supplies, and overhead, \$391,000. <p>(U) <u>FY 1996</u></p> <ul style="list-style-type: none"> - (U) Attend JOCOTAS and ASTM meetings. Coordinate with other Air Force agencies. Fund ESC personnel, contractor support travel, equipment, supplies, and overhead, \$223,000. <p>(U) <u>FY 1997</u></p> <ul style="list-style-type: none"> - (U) Attend JOCOTAS and ASTM meetings. Coordinate with other Air Force agencies. Fund ESC personnel, contractor support travel, equipment, supplies, and overhead, \$192,000. 											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

5 - Engineering And Manufacturing Development

0604708F Civil, Fire, Environment & Shelter Engrg

2674

(U) B. Program Change Summary (\$ in Thousands)

	FY 1994	FY 1995	FY 1996	FY 1997	Total Cost Cont
(U) Previous President's Budget	1,577	591	324	273	
(U) Appropriated Value	1,577	591			
(U) Adjustments to Budget Years Since FY 95 PB			(101)	(81)	
(U) Adjustments to Appropriated Value	(51)				
a. Undistributed Congressional Reductions					
(U) Current Budget Submit/President's Budget	1,526	591	223	192	Cont

(U) Change Summary Explanation:

Funding: FY 96 and FY 97 programs adjusted for inflation and to cover higher priority requirements.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. Other Program Funding Summary (\$ in Thousands): Not Applicable.(U) D. Schedule Profile: Not Applicable.

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)				DATE	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE			
5 - Engineering And Manufacturing Development		0604708F Civil, Fire, Environment & Shelter Engrg			2674
(U) A. <u>Project Cost Breakdown (\$ in Thousands)</u>					
		FY 1994	FY 1995	FY 1996	FY 1997
(U) Study Electromagnetic Interference (EMI)		35			
(U) Shelter Chemical/Biological Development Program		50			
(U) Field Application of EMI Coatings		35			
(U) Environmental Control Unit R-134a Upgrade		200	200		
(U) New Shelter Systems		140			
(U) Shelters 2000 Program		275			
(U) Engineering Support		791	391	223	192
(U) Total		1,526	591	223	192
(U) B. <u>Budget Acquisition History and Planning Information (\$ in Thousands):</u> Not Applicable.					
(U) C. <u>Funding Profile (\$ in Thousands):</u> Not Applicable.					

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DATE

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BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

5 - Engineering And Manufacturing Development

0604708F Civil, Fire, Environment & Shelter Engrg

3788

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
3788 Environmental Quality	752	665	662	739	768	798	822	846	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

Develops equipment, materials, and processes in support of the Air Force environmental program including pollution prevention, compliance, restoration, and conservation. The focus is on technologies to reduce and eliminate pollutant sources, provide cost effective waste disposal, conduct remediation, and mitigate the effects of wastes and pollutants.

(U) FY 1994

- (U) Compliance - Highly Energetic Materials, \$162,000.
- (U) Defined scope of program.
- (U) Investigated international application of technology.
- (U) Participated in lab program to build a pilot scale reactor.
- (U) Developed and submitted program proposals to National Defense Center for Environmental Excellence (NDC EE), Strategic Environmental Research and Development Program (SERDP), and Environmental Security Technology Certification Program (ESTCP).
- (U) Site Remediation, \$120,000.
- (U) Defined scope of program.
- (U) Performed technical cost evaluation on completion of current field study.
- (U) Developed and submitted integrated program to rapidly clean-up fuel spills.
- (U) Site Characterization and Analysis Penetrometer System (SCAPS), \$220,000.
- (U) Defined scope of program.
- (U) Participated in Environmental Protection Agency site demonstration.
- (U) Developed and submitted program to finish SCAPS under current contract vehicle.
- (U) Pollution Prevention, \$250,000.
- (U) Defined scope and effort involved in supporting Air Force effort to reduce the use of ODC's and HAZMATs.
- (U) Developed and submitted program proposals to NDC EE, SERDP, ETI, and ESTCP.
- (U) Started execution of replacement identification program for engines at NDC EE.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE
BUDGET ACTIVITY		February, 1995
5 - Engineering And Manufacturing Development		PE NUMBER AND TITLE 0604708F Civil, Fire, Environment & Shelter Engrg
(U) A. <u>Mission Description and Budget Item Justification Continued</u>		
(U) FY 1995		
-	(U) Compliance - Highly Energetic Material Program, \$200,000.	
-	(U) Review and comment on documentation to provide at completion of Lab transition.	
-	(U) Participate in pilot demonstration.	
-	(U) Prepare to execute program pending full funding of effort.	
-	(U) Review and develop program proposals to meet Air Force needs identified in the Air Force ESOH Technology Needs Survey.	
-	(U) Prepare for technology transition and program execution.	
-	(U) Remediation - SCAPS, \$132,000.	
-	(U) Continue to manage ARPA program.	
-	(U) Represent AF at Tri-Service meetings.	
-	(U) Inform AF users of availability of services and capabilities.	
-	(U) Pollution Prevention, \$333,000.	
-	(U) Define scope and effort involved in supporting AF effort to reduce the use of ODCs and HAZMATs.	
-	(U) Develop and submit program proposals to NDCEE and ESTCP.	
-	(U) Continue execution of replacement identification program for engines at NDCEE.	
-	(U) Review and develop program proposals to meet AF needs identified in AF ESOH Technical Needs Survey.	
-	(U) Prepare for technology transition and program execution.	
(U) FY 1996		
-	(U) Compliance - Highly Energetic Material Program, \$200,000.	
-	(U) Review and comment on documentation to provide at completion of lab effort.	
-	(U) Prepare to execute program pending full funding of effort.	
-	(U) Review and develop program proposals to meet AF needs identified in AF ESOH Technology Needs Survey.	
-	(U) Prepare for technology transition and program execution.	
-	(U) Remediation - SCAPS, \$130,000.	
-	(U) Continue to manage ARPA program.	
-	(U) Represent AF at Tri-Service meetings.	
-	(U) Inform AF users of availability of services and capabilities.	

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

BUDGET ACTIVITY

PE NUMBER AND TITLE

5 - Engineering And Manufacturing Development

0604708F Civil, Fire, Environment & Shelter Engrg

(U) A. Mission Description and Budget Item Justification Continued

- (U) FY 1996 Continued
- (U) Pollution Prevention, \$332,000.
 - (U) Define scope and effort involved in supporting AF effort to reduce the use of ODCs and HAZMATs.
 - (U) Develop and submit program proposals to NDCEE and ESTCP.
 - (U) Continue execution of replacement identification program for engines at NDCEE.
 - (U) Review and develop program proposals to meet AF needs identified in AF ESOH Technical Needs Survey.
 - (U) Prepare for technology transition and program execution.
- (U) FY 1997
- (U) Compliance - Highly Energetic Material Program, \$223,000.
 - (U) Continue to review and comment on documentation to provide at completion of lab efforts.
 - (U) Execute program pending full funding of effort.
 - (U) Continue to review and develop program proposals to meet AF needs identified in AF ESOH Technology Needs Survey.
 - (U) Prepare for technology transition and program execution.
 - (U) Remediation - SCAPS, \$148,000.
 - (U) Continue to manage ARPA program.
 - (U) Inform AF users of availability of services and capabilities.
 - (U) Represent AF at Tri-Service meetings.
 - (U) RF Heating; work a full scale solvent remediation systems at realistic depths.
 - (U) RF Heating; work a full scale solvent remediation systems at realistic depths.
 - (U) Pollution Prevention \$368,000.
 - (U) Define scope and effort involved in supporting AF effort to reduce the use of EPA 17, NESHAPS and other HAZMATs.
 - (U) Develop and submit program proposals for DOD Environmental initiatives (funding sources).
 - (U) Continue execution of material/process substitution program for engines at NDCEE.
 - (U) Review and develop program proposals to meet AF needs identified in AF ESOH Technical Needs Survey.
 - (U) Prepare for technology transition and program execution.
 - (U) Define scope and effort involved in supporting AF effort to reduce the use of ODCs and HAZMATs.
 - (U) Develop and submit program proposals for DOD Environmental initiatives (funding sources).
 - (U) Continue execution of material/process substitution program for engines at NDCEE.
 - (U) Review and develop program proposals to meet AF needs identified in AF ESOH Technical Needs Survey.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)				DATE	February, 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE		PROJECT	
5 - Engineering And Manufacturing Development		0604708F Civil, Fire, Environment & Shelter Engrg		3788	
(U) B. <u>Program Change Summary (\$ in Thousands)</u>					
(U) Previous President's Budget	FY 1994	FY 1995	FY 1996	FY 1997	Total
(U) Appropriated Value	752	665	665	743	Cost
(U) Adjustments to Budget Years Since FY 95 PB	752	665	(3)	(4)	Cont
(U) Adjustments to Appropriated Value					
(U) Current Budget Submit/President's Budget	752	665	662	739	Cont
(U) Change Summary Explanation:					
Funding: FY 96 and FY 97 programs adjusted for inflation.					
Schedule: Not Applicable.					
Technical: Not Applicable.					
(U) C. <u>Other Program Funding Summary (\$ in Thousands):</u> Not Applicable.					
(U) D. <u>Schedule Profile:</u> Not Applicable.					
;					

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE

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BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

5 - Engineering And Manufacturing Development

0604708F Civil, Fire, Environment & Shelter Engrg

3788

(U) A. Project Cost Breakdown (\$ in Thousands)

	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>
(U) Compliance	162	200	200	223
(U) Site Remediation	120	132	130	148
(U) Site Characterization and Analysis Penetrometer System	220			
(U) Pollution Prevention	250	333	332	368
(U) Total	752	665	662	739

(U) B. Budget Acquisition History and Planning Information (\$ in Thousands): Not Applicable.(U) C. Funding Profile (\$ in Thousands): Not Applicable.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#5 Engineering and Manufacturing Development		# 0604727F Joint Standoff Weapons								1000	
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Total Program Element (PE) Cost	23,143	54,304	44,025	19,562	11,961	10,374	8,595	0	0	177,376	
<p>(U) A. <u>Mission Description and Budget Item</u></p> <p>The Joint Standoff Weapon (JSOW) is an air-to-ground weapon designed to attack a variety of targets during day, night, and adverse weather conditions. JSOW will enhance aircraft survivability as compared to current interdiction weapon systems by providing the capability for launch aircraft to standoff outside the range of point defenses. The JSOW launch-and-leave capability will allow several target kills per aircraft sortie. The program provides for development and test of a dispenser design for the JSOW/BLU-108 variant which employs a BLU-108/B submunition payload. Integration of the JSOW Baseline weapon (BLU-97 Combined Effects Munition variant) and the JSOW/BLU-108 with the F-16C/D aircraft is also included. Future integration is planned with the B-1B and the F-15E. The RDT&E Research Category/Budget Activity is Engineering and Manufacturing Development because the June 1992 JSOW Acquisition Decision Memorandum directs the services to begin development of the JSOW/BLU-108 variant to support an Engineering and Manufacturing Development decision.</p> <p><u>FY 1994 Accomplishments (\$ in Thousands):</u></p> <ul style="list-style-type: none"> - Define aircraft/weapons environment (\$2,800) - Conduct simulations and continue wind tunnel testing (\$700) - Conduct System Design Review (\$2,400) - Conduct test planning and conduct flight certification for F-16 (\$3,100) - Design dispensing system, define mission planning and operational flight program requirements (\$7,433) - Demonstrate dispenser design and weapon pattern (\$5,800) - Complete Cost and Operational Effectiveness Analysis (\$910) 											

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	PROJECT NO.
BUDGET ACTIVITY	PE NUMBER AND TITLE		
#5 Engineering and Manufacturing Development	# 0604727F Joint Standoff Weapons	February 1995	1000
<p>(U) A. <u>Mission Description and Budget Item Justification (continued)</u></p> <p><u>FY 1995 Plans (\$ in Thousands):</u></p> <ul style="list-style-type: none"> - Plan, design and produce test vehicles (\$10,168) - Plan, design and initiate flight testing (\$932) - Start development of the Operational Flight Program (OFP) tape and program office flight test support for F-16 (\$8,900) - Design, develop, and test Air Force Mission Support System (AFMSS) module; perform ILS tasks; participate in Critical Design Review (CDR) (\$13,376) - Engineering support, program office support (\$4,804) - Plan, design and produce MIL-STD-1760 carriage store (\$5,000) - Design BLU-108 dispenser; perform weapon pattern optimization; conduct Preliminary Design Review (\$11,124) <p><u>FY 1996 Plans (\$ in Thousands):</u></p> <ul style="list-style-type: none"> - Plan, design and produce test vehicles (\$16,459) - Plan, design and conduct flight testing (\$5,521) - Finish development of the OFP tape for F-16 (\$500) - Design, develop, and test AFMSS module; perform ILS tasks (\$3,048) - Engineering support, program office support (\$7,567) - Conduct JSOW/BLU-108 CDR; plan, design and conduct flight testing to qualify the BLU-108 dispenser (\$10,930) <p><u>FY 1997 Plans (\$ in Thousands):</u></p> <ul style="list-style-type: none"> - Plan, design and produce Initial Operational Test & Evaluation (IOT&E) test vehicles (\$4,449) - Plan and conduct Developmental Test & Evaluation flight testing (\$6,978) - Program office support and other direct cites (\$2,943) - Plan, design and conduct flight testing to qualify BLU-108 dispenser (\$4,913) - Perform Integrated Logistics Support (ILS) tasks (\$279) 			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#5 Engineering and Manufacturing Development	# 0604727F Joint Standoff Weapons	1000	
(U) B. <u>Program Change Summary (\$ in Thousands)</u>			
Previous President's Budget	1994	1995	1996
Appropriated Value	24,614	48,966	44,251
Adjustments to Appropriated Value	24,614	55,966	
a. General Congressional Reductions	-247	-611	
b. Below Threshold Reprogramming	-944		
c. SBIR	-280	-1051	
d. Adjustments to Budget Years Since FY95 PB			
Current Budget Submit/President's Budget	23,143	54,304	44,025
		9,900	177,376
		19,562	
Change Summary Explanation:			
Funding:	FY 95 funding increased for development of BRU-55 (Smart Rack) hardware and alternate interface for MIL-STD-1760A. implementation. There were reductions for FFRDC, non-FFRDC, University research, and a general travel reduction. FY96/97 reductions from inflation adjustments. FY97 increase to satisfy RDT&E requirement for BLU-108 dispenser development. JSOW restructured with added requirement for JSOW Baseline weapon and reinforced USAF commitment to the JSOW BLU-108 variant. Other changes due to refinement of cost estimate.		
Schedule:	Air Force Development Test & Evaluation flight testing will begin 4th quarter FY95 with Initial Operational Test & Evaluation beginning 2nd quarter. Air Force will procure its first JSOW Baseline units 2nd year of Low Rate Initial Procurement (1st quarter 1998). Air Force procurement of JSOW/BLU-108 units deferred until FY02.		
Technical:	Aircraft integration, Air Force Mission Support System tasks, Air Force Integrated Logistics Support tasks, and environmental work to qualify the missile for the Air Force aircraft are common for the JSOW Baseline and JSOW/BLU-108 variants because of their physical similarities.		
(U) C. <u>Other Program Funding Summary (\$ in Thousands)</u>			
Weapon Procurement, AF	1994	1995	1996
	0	0	0
		1997	1998
		0	8,453
			1999
			13,074
		2000	2001
		12,470	20,083
			Total
			Cost
			TBD
Related RDT&E			
SEEK EAGLE			
		12,065	14,489
			3,671

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY		DATE												PROJECT NO.			
#5 Engineering and Manufacturing Development		# 0604727F Joint Standoff Weapons												1000			
(U) D. <u>Schedule Profile</u>		1994				1995				1996				1997			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<u>Acquisition Milestones</u>																	
JSOW/BLU-108 Pre-EMD				X													
JSOW BLU-108 System Design Review				X													
Air Force Aircraft Integration Tasks Contract																	
Smart Rack Development																	
JSOW Baseline Critical Design Review																	
Air Force Incorporation into Baseline Contract,																	
JSOW/BLU-108 Dispenser Development																	
JSOW/BLU-108 Preliminary Design Review																	
JSOW/BLU-108 Critical Design Review																	
JSOW Baseline Production Readiness Reviews																	
JSOW/BLU-108 LRIP Decision																	
JSOW/BLU-108 Milestone III																	
JSOW/BLU-108 Production Contract (AF)																	
JSOW/BLU-108 IOC (AF)																	
<u>T&E Milestones</u>																	
Environmental Determination Test Vehicle																	
Captive Flights																	
Dispenser Demonstration Tests																	
JSOW/BLU-108 DT&E																	
Complete OFP Development (F-16)																	
JSOW/BLU-108 IOT&E																	
JSOW/BLU-108 System Qualification Test																	

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)			DATE	PROJECT NO.
BUDGET ACTIVITY	PE NUMBER AND TITLE			
#5 Engineering and Manufacturing Development	# 0604727F Joint Standoff Weapons			1000
(U) A. <u>Program Cost Breakdown (\$ in Thousands)</u>				
	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>
Primary Hardware Development	5,338	12,595	15,515	2,643
Ancillary Hardware Development	210	122	135	139
Development Support Equipment	347	7,465	2,491	
Software Development	475	11,648	2,651	
Systems Engineering	2,860	15,202	6,741	4,964
Training Development		29	30	43
Technical Data	3,678	442	3,686	2,519
Developmental Test and Evaluation	4,891	946	5,212	3,180
Operational Test and Evaluation				2,131
Contractor Engineering Support	1,758	1,761	1,704	1,454
Government Engineering Support	1,517	1,021	935	963
Program Management Support/	2,069	3,073	4,925	1,526
Other Direct Cite				
Total	23,143	54,304	44,025	19,562

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)							DATE	February 1995				
BUDGET ACTIVITY		PE NUMBER AND TITLE				PROJECT NO.						
#5 Engineering and Manufacturing Development		# 0604727F Joint Standoff Weapons				1000						
(U) B. <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u>												
Performing Organizations:												
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program	
<u>Product Development Organizations</u>												
Texas Instruments	SS/CPIF	various	TBD	TBD	3,755	16,533	32,412	31,408	13,115	18,425	115,648	
Lockheed	MIPR to ASC/YP	various	TBD	TBD			8,900	500			9,400	
M Tech	SS/SBIR	various	TBD	TBD		510	5,000				5,510	
Phase 3, FP/CPIF												
Textron	TBD	TBD	TBD	TBD		60	2,884	2,140	874		5,958	
<u>Support and Management Organizations</u>												
China Lake NWC	MIPR	various	TBD	TBD	52	850	1,021	935	963	3,067	6,888	
Miscellaneous	Misc	various	TBD	TBD	1,573	3,981	3,866	6,629	1,979	9,438	27,466	
<u>Test and Evaluation Organizations</u>												
AFDTC, Eglin AFB	PO	various	TBD	TBD	32	1,209	221	2,413	2,631		6,506	
Grand Total												
					5,412	23,143	54,304	44,025	19,562	30,930	177,376	

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#5 - Engineering and Manufacturing Development		#0604735F Combat Training Ranges (CTR)								2286	
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Combat Training Ranges/2286	15,846	13,682	10,418	16,098	24,020	14,085	14,505	14,935	Cont	TBD	

(U) A. Mission Description and Budget Item Justification

The Combat Training Ranges (CTR) Program directly contributes to the effectiveness and survivability of US combat forces by developing range instrumentation and training systems to increase the effectiveness of the training spectrum from individual aircrew skill training to large-scale exercises. Develops the electronic, telecommunications, and instrumentation equipment/systems for the operational test and training ranges worldwide. These systems provide real-time monitoring and control of aircrew air-to-air, air-to-ground, and electronic warfare training along with the ability to record events for crew debriefing and analysis. The primary developmental effort is the Nellis Air Combat Training System (NACTS) at Nellis AFB. NACTS is a Global Positioning System (GPS) based system to replace the current Red Flag Measurement and Debriefing System (RFMDS) increasing to 100 the number of instrumented participants, improving aircraft position tracking accuracy, expanding range coverage, multiplying weapons simulations and adding electronic warfare threat/aircrew interaction. The development effort involves software development to increase the number of high activity players as well as the integration and test of the training system comprised of ground equipment and aircraft pods purchased by procurement funding. NACTS will be compatible with advanced avionics equipment being integrated throughout the Armed Services and the Distributed Interactive Simulation (DIS), as a minimum, at the system level. This project also provides the capability to evaluate effectiveness of aircrew tactics and countermeasures operating against hostile electronic combat threats. Other continuing efforts support interoperability of Air Force instrumented ranges with other services and System Program Office (SPO) basic operating support.

The AF has also joined the Navy-led Joint Tactical Combat Training System (JTCTS) development effort for the next generation of range upgrades for all AF ranges. This is a change from the earlier planned Joint Air Combat Training System (JACTS) program and was a result of the FY94 SASC directed review by OSD of the AF range modernization program. JTCTS is a GPS based system able to track aircraft, surface vessels, and submarines. Future effort will incorporate ground participants as well. Procurement funding will be used for ground equipment and aircraft pods. Contract award 2 QTR FY95. AF first article delivery scheduled for FY99 to the Yukon range. The acquisition strategy is competitive, cost plus contracts.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.			
#5 - Engineering and Manufacturing Development		#0604735F Combat Training Ranges (CTR)								2286			
COST (\$ in Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost		
Combat Training Ranges/2286		15,846	13,682	10,418	16,098	24,020	14,085	14,505	14,935	Cont	TBD		
(U) FY 1994													
-	(U) Continued CTR basic operating support, system software acquisition, and systems engineering support (\$2.8M)												
-	(U) Continued to develop (with Navy) interoperability improvements and aircraft interface with range instrumentation pods and software upgrades (\$2.4M)												
-	(U) Continued development of Advanced Message Oriented Data Security Module (AMODSM) (\$0.5M)												
-	(U) Begin Engineering Manufacturing and Development (EMD) of the Nellis Air Combat Training System (NACTS) (\$9.9M)												
	-- (U) Design/analysis of system requirements and allocation to the subsystem level (NSP)												
	-- (U) Software design/development (NSP)												
	-- (U) Develop interface for existing government weapon simulations (NSP)												
	-- (U) Site surveys (NSP)												
	-- (U) Redesign of Government Furnished Equipment and software (NSP)												
	-- (U) Design activities related to aircraft interface (NSP)												
	-- (U) Initiate development of prototype pod (NSP)												
-	(U) Demodification Bomber Airborne Instrumentation System (BAIS) aircraft (Program canceled by user) (\$0.2M)												
(U) FY 1995													
-	(U) Continue CTR basic operating support, system software acquisition, and systems engineering support (\$2.9M)												
-	(U) Continue of EMD of NACTS (\$8.5M)												
	-- (U) Conduct software design and development through Preliminary Design Review (PDR) (NSP)												
	-- (U) Develop and test prototype pod (NSP)												
	-- (U) Initiate support equipment development (NSP)												
	-- (U) Finalize hardware design (NSP)												
	-- (U) Initiate the unit level hardware/software testing (NSP)												
-	(U) Continue interoperability improvements with Navy and development of aircraft interface with range instrumentation pods and software upgrades (\$2.0M)												
-	(U) Other technical support (\$0.2M)												

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#5 - Engineering and Manufacturing Development		#0604735F Combat Training Ranges (CTR)								2286	
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Combat Training Ranges/2286	15,846	13,682	10,418	16,098	24,020	14,085	14,505	14,935	Cont	TBD	
(U) <u>FY 1996</u>											
-	(U)	Continue CTR basic operating support, system software acquisition, and systems engineering support (\$3.2M)									
-	(U)	Continue Engineering Manufacturing and Development (EMD) of the Nellis Air Combat Training System (NACTS) (\$6.0M)									
	--	(U)	Continue NACTS software design through Critical Design Review and incorporate into hardware (NSP)								
	--	(U)	Continue prototype pod flight test development program (NSP)								
	--	(U)	Finalize support equipment design (NSP)								
	--	(U)	Initiate hardware qualification tests (NSP)								
	--	(U)	Initiate SEEK EAGLE certifications program (NSP)								
	--	(U)	Initiate software qualification testing (NSP)								
-	(U)	Continue interoperability improvements with the Navy and development of aircraft interface with range instrumentation pods and software upgrades (\$0.1M)									
-	(U)	Continue Advanced Message Oriented Data Security Module (AMODSM) development with the Navy (\$1.0M)									
-	(U)	Begin participation in Joint Tactical Combat Training System (JTCTS) - AF unique requirements (\$0.1M)									
(U) <u>FY 1997</u>											
-	(U)	Continue CTR basic operating support, system software acquisition, and systems engineering support (\$3.5M)									
-	(U)	Complete EMD of NACTS (\$12.1M)									
	--	(U)	Finalize NACTS software design (NSP)								
	--	(U)	Complete EMD design and development activities (NSP)								
	--	(U)	Complete hardware and software qualification testing (NSP)								
	--	(U)	Complete prototype flight testing and continue SEEK EAGLE as required (NSP)								
	--	(U)	Finalize weapons simulation development efforts and aircraft interface activities (NSP)								
-	(U)	Continue interoperability improvements with the Navy and aircraft interface with range instrumentation pods and software upgrades (\$0.2M)									
-	(U)	Continue support for JTCTS (\$0.3M)									

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY		PE NUMBER AND TITLE		DATE	PROJECT NO.
#5 - Engineering and Manufacturing Development		#0604735F Combat Training Ranges (CTR)		February 1995	2286
(U) B. <u>Program Change Summary (\$ in Thousands)</u>					
Previous President's Budget	1994	1995	1996	1997	Total
Appropriated Value	15,714	18,301	22,171	15,080	Cost
Adjustments to Appropriated Value	15,714	18,301			TBD
a. Congressional General Reduction	-268	-4,354			
b. Below Threshold Reprogramming (BTR)	400				
c. Small Business Innovative Research (SBIR)		-265*			
d. Adjustment to Budget Years Since FY95 Budget			-11,753	1,018	
Current Budget Submit/President's Budget	15,846	13,682	10,418	16,098	TBD
* SBIR adjustments not reflected in ABIDES database.					
Change Summary Explanation:					
Funding: Rephased program in FY96 as a result of the Nellis delay due to the OSD review. Result was a year delay in the AF participation in Joint Tactical Combat Training System (JTCTS) and no funding for Software Interoperability. FY97 JTCTS shortfall effort to be funded from within Combat Training Ranges procurement funding.					
Schedule: Nellis Air Combat Training System (NACTS)/Nellis Upgrade delayed one year due to SASC directed OSD review of Air Force range improvement program. OSD authorized release of Nellis Upgrade request for proposal 3 Jun 94.					
Technical: On 9 Sep 94 OSD Review directed the services to participate in a joint combat training system using the Navy's TCTS architecture. This program will incorporate mobile at-sea, fixed land-based and transportable requirements. Initial schedule is for the AF IOC at Yukon in FY99. There is no unnecessary duplication of effort in the Air Force or the Department of Defense.					

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

#5 - Engineering and Manufacturing Development

#0604735F Combat Training Ranges (CTR)

2286

(U) C. Other Program Funding Summary (\$ in Thousands)

	1994	1995	1996	1997	1998	1999	2000	2001	To Compl	Total Cost
23,903	11,607	2,079	31,832	20,094	21,447	21,581	22,232	N/A	N/A	Cont

PE 27429F: Appropriation: Other Procurement, AF, Budget Activity: OPAF/Electronics & Telecommunications Equipment, Program Title: Combat Training Ranges

PE 27429F: Appropriation: Aircraft Procurement, AF, Budget Activity: A/C Procurement/Other Production Charges, Program Title: Combat Training Ranges

8,115	26,406	3,795	29,354	17,096	17,794	18,329	18,880	N/A	N/A	Cont
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(U) D. Schedule Profile

	1994		1995			1996			1997		
	1	2	3	4	1	2	3	4	1	2	3
4											

Nellis Air Combat Training System (NACTS)

Request for Proposal Release

Contract Award

Preliminary Design Review*

Phase 1 Ground Equipment Production Review

Critical Design Review*

Phase 2 Ground Equipment Production Review

Aircraft Pod Production Readiness Review*

X

X

X

X

X

X

*Program schedule milestones will be submitted by prime contractor under an integrated master plan/schedule.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

#5 - Engineering and Manufacturing Development

#0604735F Combat Training Ranges (CTR)

2286

(U) D. Schedule Profile Continued

1994			1995			1996			1997		
1	2	3	4	1	2	3	4	1	2	3	4

Joint Tactical Combat Training System (JTCTS)

Contract Award

PDR

Phased CDR

Development Test/Operational Test

IOC (1999)

X

X

X

X*

X**

X*

Software Interoperability

Yearly Block 5 Upgrade

Yearly Block 6 Upgrade

Yearly Block 7 Upgrade

X

X

X

Advanced Message Oriented Data Security Module (AMODSM)

RFP Release

Contract Award

Deliver Engineering Development

Models (EDMs)

Production (1998)

X

X

X

Bomber Airborne Instrumentation System (BAIS)

PRR

Functional Configuration Audit/

Physical Configuration Audit

Production Decision - Program Canceled

X

X

X

Note: X* = Milestone Beginning X** = Milestone Completion

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY					PE NUMBER AND TITLE								
5 Engineering and Manufacturing Development					0604740F, Computer Resource Technology Transition								
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost			
Total Program Element (PE) Cost*	13,672	20,620	2,166	2,048	2,177	2,240	2,414	2,593	Cont	TBD			
2522, Advanced Computer Tech Transition	2,662	8,259	1,458	1,353	1,412	1,409	1,558	1,712	Cont	TBD			
2523, Architectural Implementation	1,918	1,392	708	695	765	831	856	881	Cont	TBD			
2524, Reuse and Component Support	6,652	0	0	0	0	0	0	0	Cont	CTBD			
3315, Digital Info Technology Transition	2,440	2,469	**	**	**	**	**	**	Cont	TBD			
A. <u>Mission Description and Budget Item Justification</u>													
(U) BRIEF DESCRIPTION OF ELEMENT: Specifically, the Computer Resource Technology Transition (CRTT) program addresses problems of acquiring, developing, and supporting emerging computer resources. The goal of this program is to reduce software lifecycle costs and to improve the quality of computer systems development and support. This is the only Air Force program for transitioning software technology across the board into the USAF (rather than into a specific acquisition program). The program consists of five major projects. Project 2522 will establish the foundational elements of an effective methodology to support technology transition efforts program-wide and will provide for implementation of technology receptor groups and development of methodology to support transitioned capability. Project 2523 will initially address a particular instantiation, namely command and control architectures, of reusable technology which are available or can be developed in the near term. Project 2524 is a Congressional special interest item and will address the technologies/processes inherent in operating and maintaining a domain central repository of software, software algorithms, and reusable technologies. Project 3315 will provide a totally integrated capability to create, accept, retrieve and store digital (paperless) technical information for life cycle support for Air Force logistics. All projects are now in actual development.													
*FY95 includes \$8.5M for the Integrated Data System which will be budgeted & executed in a new PE 63108F, Integrated Data System.													
**Funds were transferred into PE 0708611F starting in FY96 from PE 060740F													

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE		
5 Engineering and Manufacturing Development	060740F, Computer Resource Technology Transition		
B. <u>Program Change Summary (\$ in Thousands)</u>			
Previous President's Budget	1994 13,831	1995 6,621	1997 6,613
Appropriated Value	14,137	21,121	
Adjustments to Appropriated Value			
a. Congressional General Reduction	-306	-266	
b. SBIR	-159	-235	
Current Budget Submit/President's Budget	13,672	20,620	2,048
Change Summary Explanation:			Total Cost TBD
Funding: FY95 & FY96 increases to fund Congressional special interest programs			
Air Force reduced FY96 and beyond to fund other higher priority items			
Schedule: Project start-ups delayed until funds are available			
Technical: None			
C. <u>Other Program Funding Summary (\$ in Thousands)</u>			
Not Applicable			
D. <u>Schedule Profile</u>			
Not Applicable			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
5 Engineering and Manufacturing Development		060740F, Computer Resource Technology Transition								2522	
COST (\$ In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Advanced Computer Technology Transition	2,662	8,259	1,458	1,353	1,412	1,409	1,558	1,712	Cont	TBD	
<p>A. Mission Description and Budget Item Justification</p> <p>(U) Project 2522, Advanced Computer Technology Transition: Develop, through interaction with AF MAJCOMs, tools and technologies for improving the software development environment and processes and accelerating transition of software technology to the users. Emphasis will be placed on identifying software technology items which provide the best return on investment and setting up receptor groups at the user organizations that support transition and production.</p> <p>(U) FY 1994 Accomplishments:</p> <ul style="list-style-type: none"> (U) - Continued to develop technology transition infrastructure within the Air Force (1,112K). (U) - Continued funding JLC activities in software re engineering and modernization of obsolescent, expensive software (300K). (U) - Transitioned technology transition management courses to AF users (100K). (U) - Continued transitioning software process improvement methods into Air Force software Central Design Activities (CDAs) (150K). (U) - Began development and implementation of Air Force-wide metrics repository (1,000K). <p>(U) FY 1995 Plans:</p> <ul style="list-style-type: none"> (U) - Continue to develop technology transition infrastructure within the Air Force (3,059K). (U) - Continue funding JLC activities in software re engineering and modernization of obsolescent, expensive software (300K). (U) - Complete development and continue to implement Air Force-wide metrics repository (950K). (U) - Continue implementation of software reuse (3,950K) (U) - Transfer funds for Congressional special interest program located in PE 0603108F (8,500K) <p>(U) FY 1996 Plans:</p> <ul style="list-style-type: none"> (U) - Continue to develop technology transition infrastructure within the Air Force (396K). (U) - Continue funding JLC activities in software re engineering and modernization of obsolescent, expensive software (155K). (U) - Transition technology tools and methods to Air Force users (753K) (U) - Continue to implement Air Force-wide metrics repository (154K). <p>(U) FY 1997 Plans:</p> <ul style="list-style-type: none"> (U) - Continue to develop technology transition infrastructure within the Air Force (396K). (U) - Continue funding JLC activities in software re engineering and modernization of obsolescent, expensive software (155K). (U) - Transition technology tools and methods to Air Force users (648K) (U) - Continue to implement Air Force-wide metrics repository (154K). 											

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995																																																
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.																																																	
5 Engineering and Manufacturing Development	060740F, Computer Resource Technology Transition	2522																																																	
<p>B. <u>Program Change Summary (\$ in Thousands)</u></p> <table border="1"> <thead> <tr> <th></th> <th>1994</th> <th>1995</th> <th>1996</th> <th>1997</th> <th>Total Cost</th> </tr> </thead> <tbody> <tr> <td>Previous President's Budget</td> <td>2,702</td> <td>2,625</td> <td>2,770</td> <td>2,707</td> <td>TBD</td> </tr> <tr> <td>Appropriated Value</td> <td>2,702</td> <td>16,959</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Adjustments to Appropriated Value</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>a. Congressional General Reduction</td> <td>-40</td> <td>-100</td> <td></td> <td></td> <td></td> </tr> <tr> <td>b. SBIR</td> <td></td> <td>-100</td> <td></td> <td></td> <td></td> </tr> <tr> <td>c. Realignment</td> <td></td> <td>-8,500</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Current Budget Submit/President's Budget</td> <td>2,662</td> <td>8,2559</td> <td>1,458</td> <td>1,353</td> <td>TBD</td> </tr> </tbody> </table> <p>Change Summary Explanation: Funding: FY96 increase to fund Congressional special interest programs Air Force reduced FY96 and beyond to fund other higher priority items. \$8.5M is for the Integrated Data System and will be budgeted & executed in a new PE 63108F, Integrated Data Systems</p> <p>Schedule: None Technical: None</p> <p>C. <u>Other Program Funding Summary (\$ in Thousands)</u> Not Applicable</p> <p>D. <u>Schedule Profile</u> Not Applicable</p>					1994	1995	1996	1997	Total Cost	Previous President's Budget	2,702	2,625	2,770	2,707	TBD	Appropriated Value	2,702	16,959				Adjustments to Appropriated Value						a. Congressional General Reduction	-40	-100				b. SBIR		-100				c. Realignment		-8,500				Current Budget Submit/President's Budget	2,662	8,2559	1,458	1,353	TBD
	1994	1995	1996	1997	Total Cost																																														
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UNCLASSIFIED

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.			
5 Engineering and Manufacturing Development		060740F, Computer Resource Technology Transition								2523			
COST (\$ In Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost		
2523, Architectural Implementation		1,918	1,392	708	695	765	831	856	881	Cont	TBD		
<p>A. Mission Description and Budget Item Justification</p> <p>(U) This project develops, through rapid prototyping and interaction with Air Force users, a tailorable architecture for support of command and control applications. The architecture will address the components common to most command centers (e.g., message processing, display processing, user interfaces) and will focus on the migration of multilevel computer security applications/technologies into AF operations. This project is needed to mitigate development time associated with command center acquisitions so that the system is not obsolete when delivered.</p> <p>(U) FY 1994 Accomplishments:</p> <p>(U) - Defined tailorable command center architecture and continue to qualify software components (1,018K).</p> <p>(U) - Continued development of Command Center Concept of Operations (100K).</p> <p>(U) - Continued identifying multilevel security issues/solutions and STAF testing, analysis and technology transition (800K).</p> <p>(U) FY 1995 Plans:</p> <p>(U) - Update tailorable command center architecture and continue to qualify software components (800K).</p> <p>(U) - Continue development of Command Center Concept of Operations (100K).</p> <p>(U) - Continue identifying multilevel security issues/solutions and STAF testing, analysis and technology transition (492K).</p> <p>(U) FY 1996 Plans:</p> <p>(U) - Update tailorable command center architecture and continue to qualify software components (500K).</p> <p>(U) - Continue identifying multilevel security issues/solutions and STAF testing, analysis and technology transition (208K).</p> <p>(U) FY 1997 Plans:</p> <p>(U) - Update tailorable command center architecture and continue to qualify software components (493K).</p> <p>(U) - Continue identifying multilevel security issues/solutions and STAF testing, analysis and technology transition (203K).</p>													

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	PROJECT NO.
BUDGET ACTIVITY	PE NUMBER AND TITLE		
5 Engineering and Manufacturing Development	060740F, Computer Resource Technology Transition	2523	
B. <u>Program Change Summary (\$ in Thousands)</u>			
Previous President's Budget Appropriated Value	<div>1994</div> <div>1,955</div> <div>1,955</div>	<div>1995</div> <div>1,493</div> <div>1,493</div>	<div>1997</div> <div>1,395</div> <div>TBD</div>
Adjustments to Appropriated Value	-37		
a. Congressional General reduction			
b. SBIR			
Current Budget Submit/President's Budget	1,918	708	695
Change Summary Explanation:			
Funding: Air Force reduced FY96 and beyond to fund other higher priority items.			
Schedule: None			
Technical: None			
C. <u>Other Program Funding Summary (\$ in Thousands)</u>			
Not Applicable			
D. <u>Schedule Profile</u>			
Not Applicable			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.			
5 Engineering and Manufacturing Development		060740F, Computer Resource Technology Transition								2524			
COST (\$ in Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost		
2524, Reuse and Reusable Component Support		6,652	0	0	0	0	0	0	0	0	TBD		
<p>A. <u>Mission Description and Budget Item Justification</u></p> <p>(U) Congress appropriated \$7.0 M in FY94 for this special interest item to develop a documented knowledge for establishing software reuse libraries that support specific application domains. These libraries will support system engineers through the reuse of large scale software components. This program is needed so that the Air Force can reuse software that it has already purchased by developing a central repository of software and software algorithms. Reusing software will result in lower software development costs, faster software development schedules, and lower software development risks.</p> <p>(U) FY 1994 Accomplishments:</p> <p>(U) - Provide knowledge to others on establishing domain-based reuse (300K).</p> <p>(U) - Supported Domain Specific Prototyping (300K).</p> <p>(U) - Initial transition of blueprint to DoD (100K).</p> <p>(U) - Populated command and control library with software artifacts(500K).</p> <p>(U) - Continued refinement of blueprint (5,611K).</p> <p>(U) FY 1995 Plans: (not applicable)</p> <p>(U) FY 1996 Plans: (not applicable)</p> <p>(U) FY 1997 Plans: (not applicable)</p>													

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	PROJECT NO.																																										
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5 Engineering and Manufacturing Development	060740F, Computer Resource Technology Transition		2524																																										
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	1994	1995	1996	1997	Total Cost																																								
Previous President's Budget	0	0	0	0	TBD																																								
Appropriated Value	7,000																																												
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Current Budget Submit/President's Budget	6,652	0	0	0	TBD																																								
<p>C. <u>Other Program Funding Summary (\$ in Thousands)</u></p> <p>Not Applicable</p>																																													
<p>D. <u>Schedule Profile</u></p> <p>Not Applicable</p>																																													

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY				PE NUMBER AND TITLE						PROJECT NO.			
5 Engineering and Manufacturing Development				060740F Computer Resource Technology Transition						3315			
COST (\$ In Thousands)				FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
3315, Digital Information Technology Transition				2,440	2,469		*	*	*	*	*	Cont	TBD
<p>A. Mission Description and Budget Item Justification</p> <p>(U) DOD Defense Guidance and Office of the Secretary of Defense (OSD) funding initiatives have emphasized the need to improve the preparation, delivery, use and updating of digital technical information used in the design, manufacture, maintenance, and operation of DQD weapon systems. This project is needed to transition from a paper-intensive weapon system acquisition and support process to a largely automated and integrated mode of operations. This will allow the Air Force to create data once and use it many times.</p> <p>(U) FY 1994 Accomplishments:</p> <ul style="list-style-type: none"> (U) - Continued to manage the development and implementation of an AF digital product data infrastructure (1,195K). (U) - Planned for AF CPO participation in CALS EXPO 94 (85K), (2nd - 4th Qtr). (U) - Developed test cases for AF infrastructure to implement CALS (485K), (2nd - 4th Qtr). (U) - Developed and coordinated digital data strategy (450K), (2nd - 4th Qtr). (U) - Transitioned Air Force CALS Strategic Plan/Roadmap into electronic document (225K). <p>(U) FY 1995 Plans:</p> <ul style="list-style-type: none"> (U) - Continue to manage the development and implementation of the Air Force digital product data infrastructure (1,410K). (U) - Manage the deployment of digital technical and engineering product data systems such as Joint Computer-aided Acquisition and Logistics Support (JCALS) and Joint Engineering Data Management and Information Control System (JEDMICS) (760K), (1st Qtr). (U) - Plan and implement the conversion of AF legacy data for use by future systems such as JCALS and JEDMICS (70K), (3rd Qtr). (U) - Coordinate transition from AF legacy data systems to digital technical and engineering product data systems such as JCALS and JEDMICS (109K), (3rd Qtr). (U) - Develop and present CALS orientation materials and instruction to AF users of digital product data systems such as JCALS and JEDMICS (120K), (1st Qtr). 													

*Funds were transferred into PE 0708611F starting in FY96 from PE 060740F

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	PROJECT NO.																																										
BUDGET ACTIVITY	PE NUMBER AND TITLE																																												
5 Engineering and Manufacturing Development	060740F, Computer Resource Technology Transition	3315																																											
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	1994	1995	1996	1997	Total Cost																																								
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b. SBIR		-100																																											
Current Budget Submit/President's Budget	2,440	2,469	*	*	TBD																																								
<p>C. <u>Other Program Funding Summary (\$ in Thousands)</u></p> <p>Not Applicable ;</p>																																													
<p>D. Schedule Profile</p> <p>Not Applicable</p>																																													

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February, 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
5 - Engineering And Manufacturing Development		0604750F Intelligence Equipment								2053	
	COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
2053	National Air Intel Center	2,753	2,554	1,294	1,268	1,341	1,401	1,484	1,476	Continuing	TBD
<p>(U) A. <u>Mission Description and Budget Item Justification</u></p> <p>(U) This project provides continuing development and upgrade of National Air Intelligence Center (NAIC) (formerly FASTC) threat analysis capabilities through development/integration of Analysis System Software and through refinement/improvement of Analysis Methodologies and Individual Analysis Tools. NAIC is tasked with providing detailed foreign technology intelligence information to a variety of both DOD and Non DOD customers. In the past few years, customer's requirements have been more sophisticated, dictating more detailed and timely intelligence not only in the technology regime but also in the economic, world crisis, and political arenas. The Rome Laboratory must develop new intelligence analysis technology to provide the capability to NAIC dictated by world events. This program is in Engineering and Manufacturing Development.</p> <p>(U) <u>FY 1994</u></p> <ul style="list-style-type: none"> - (U) Completed Communications Network Model Full Operational Capability. (\$70) - (U) Completed Low Observable Design Synthesis Tool. (\$90) - (U) Completed Expert Tutor. (\$450) - (U) Continued Model Synthesis Interface. (\$250) - (U) Continued RF Weapons Modeling. (\$870) - (U) Continued Flexible IF Signature Techniques - FIST. (\$643) - (U) Initiated Man-In-The-Loop Engagement Simulation. (\$380) <p>(U) <u>FY 1995</u></p> <ul style="list-style-type: none"> - (U) Continue Model Synthesis Interface. (\$330) - (U) Complete RF Weapons Modeling. (\$250) - (U) Continue Flexible IR Signature Techniques - FIST. (\$540) - (U) Continue Air Surveillance C3. (\$500) - (U) Continue Man-In-The-Loop Engagement Simulation. (\$250) - (U) Initiate Electronic Counter Measures (ECM) Reference Model. (\$564) - (U) Complete Threat Assessment Support Equipment (TASE) Verification. (\$120) 											

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

0604750F Intelligence Equipment

PROJECT

2053

5 - Engineering And Manufacturing Development

(U) FY 1996

- (U) Continue Model Synthesis Interface. (\$500)
- (U) Complete flexible IR Signature Techniques - FIT. (\$130)
- (U) Complete Air Surveillance C3. (\$325)
- (U) Complete Man-In-The-Loop Engagement Simulation. (\$294)
- (U) Complete ECM Reference Model. (\$45)

(U) FY 1997

- (U) Continue Model Synthesis Interface. (\$680)
- (U) Complete Electromagnetic Antenna Modeling. (\$214)
- (U) Initiate Automated Electro-Optic Tools. (\$190)
- (U) Initiate IPIDS/Reference threat Packages. (\$184)

(U) B. Program Change Summary (\$ in Thousands)

	FY 1994	FY 1995	FY 1996	FY 1997	Total Cost TBD
(U) Previous President's Budget	2,859	2,633	2,650	2,574	
(U) Appropriated Value	2,859	2,633			
(U) Adjustments to Appropriated Value					
a. General Congressional Reduction	-54	-30			
b. Below Threshold Reprogramming	-52	-49			
c. SBIR					
(U) Adjustments to Budget Years Since FY95 PB			-1,356	-1,306	
(U) Current Budget Submit/President's Budget	2,753	2,554	1,294	1,268	TBD

(U) Change Summary Explanation:

Funding: Planned activities for FY96 cannot be started until FY98.

Schedule:

Technical:

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE		February, 1995		PROJECT			
BUDGET ACTIVITY										PE NUMBER AND TITLE						2053	
5 - Engineering And Manufacturing Development										0604750F Intelligence Equipment							
(U) C. Other Program Funding Summary (\$ in Thousands)																	
(U) Not Applicable																	
(U) D. Schedule Profile																	
(U) Communications Network Model																	
Full Operational Capability																	
(U) Complete Low Observable Design																	
Synthesis Tool																	
(U) Complete Expert Tutor																	
(U) Complete Model Synthesis Interface																	
(U) Complete RF Weapons Modeling																	
(U) Complete Flexible IR Signature																	
Techniques																	
(U) Initiate Air Surveillance C3																	
(U) Complete Air Surveillance C3																	
(U) Begin Man-In-The-Loop																	
Engagement Simulation																	
(U) Complete Man-In-The-Loop																	
Engagement Simulation																	
(U) Begin ECM Reference Model																	
(U) Complete ECM Reference Model																	
(U) Begin TASE Verification																	
(U) Complete TASE Verification																	
(U) Begin Electromagnetic Antenna																	
Modeling																	
(U) Complete Electromagnetic Antenna																	
Modeling																	
(U) Begin Automated Electro-Optic																	
Tools																	
(U) Begin IPIDS/Reference Threat																	
Packages																	

Page 3 of 5 Pages

Exhibit R - 2

UNCLASSIFIED

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

5 - Engineering And Manufacturing Development

0604750F Intelligence Equipment

2053

(U) A. Project Cost Breakdown (\$ in Thousands)

	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>
(U) Communications Network Model Fully Operational Capability (FOC)	\$70			
(U) Low Observable Design Synthesis Tool	\$90			
(U) Expert Tutor	\$450			
(U) Model Synthesis Interface	\$250	\$330	\$500	\$680
(U) RF Weapons Modeling	\$870			
(U) Flexible IR Signatures Techniques	\$643		\$130	
(U) Air Surveillance C3	\$0	\$500	\$325	
(U) Man-In-The-Loop Engagement Simulation	\$380	\$250	\$294	
(U) EMCM Reference Model		\$564	\$45	
(U) TASE Verification		\$120		
(U) Electromagnetic Antenna Modeling				\$214
(U) Automated Electro-Optics Tools				\$190
(U) IPIDS/Reference Treat Packages				\$184
(U) Total	\$2,753	\$2,554	\$1,294	\$1,268

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Exhibit R-3

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)						DATE	PROJECT					
BUDGET ACTIVITY		PE NUMBER AND TITLE										
5 - Engineering And Manufacturing Development		0604750F Intelligence Equipment					2053					
(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)												
Performing Organizations:												
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1994	Budget FY 1994	Budget FY 1995	Budget FY 1996	Budget FY 1997	Budget to Complete	Total Program	
Product Development Organizations												
(U) Rome Laboratory						462	317	238	213	Cont	TBD	
Adroit Systems	93-C-098	6 Sep 91	705	705	694	11					705	
McDonnell Doug	92-C-0015	6 Jan 92	741	741	705	36					741	
Gen Rsch Corp	91-D-0042	3 Aug 93	642	642	276	366					642	
Gen Rsch Corp	93-C-0261	30 Sep 93	2256	2256	55	197	286	472	655	591	2256	
Rockwell		1 Apr 93	1511	1511	495	797	219				1511	
Photon Rsch	93-C-0182	30 Sep 93	1182	1182	2	584	482	114			1182	
Gen Rsch Corp	93-C-0261	24 Apr 93	770	770	0	300	200	270	400	Cont	770	
Contractor TBD							1050	200			TBD	
Total Project						2,753	2,554	1,264	1,268	Cont	TBD	
Government Furnished Property:												
(U) Not Applicable												
Subtotal Product Development												
Subtotal Support and Management												
Subtotal Test and Evaluation												
Total Project						2,753	2,554	1,294	1,268	Cont	TBD	

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Exhibit R-3

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Exhibit R-3

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

5 - Engineering And Manufacturing Development

0604754F Jt Tac Info Dist Sys

P771

		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
	COST (In Thousands)										
P771	JTIDS	13,066	10,978	10,146	9,594	9,763	9,983	10,401	10,829	41,194	265,814

(U) A. Mission Description and Budget Item Justification

JTIDS Budget Activity, Engineering and Manufacturing Development effort provide Army, Navy, Air Force, and Marine Theater Command and Control (C2) elements with a secure, jam-resistant, high capacity data link communications system for use in a tactical combat environment. The Joint Tactical Information Distribution System (JTIDS) family of terminals (Class 2 and 2H for the Air Force, Navy and Marine Corps; and 2M for Army) is a joint development program which employs Time Division Multiple Access (TDMA), and spread spectrum techniques. JTIDS will permit rapid and secure exchange of essential command control, and status information among all terminals in the tactical theater. Host platform (i.e. E-3, E-8, F-15, RIVET JOINT, ABCCC, MAOC, and MCE) program and budget for JTIDS production terminals.

(U) FY 1994

- (U) Development Planning and Execution. (\$6,400)
- (U) Continue terminal hardware/software updates, including converting from a proprietary Central Processing Unit (CPU) to a commercial off the shelf processor.
- (U) Continue system integration and software development for E-3, E-8, F-15, RIVET JOINT, ABCCC, MAOC, and MCE platforms.
- (U) Production Planning and Execution. (\$500)
- (U) Prepare MS III Defense Acquisition Board (DAB) materials and procurement package for contract award.
- (U) Logistics. (\$2,166)
- (U) Continue efforts to establish Interface Software Support Activity (ISSA).
- (U) Provided pre-operational support to terminal assets pending platform initial operational capability.
- (U) Test/Demonstrations (\$700)
- (U) Verify Material Improvement Program (MIP) corrections and support E-8, ABCCC, and MCE development efforts.
- (U) Support Air Force host platform participation in joint exercises in Ballistic Missile Defense demonstrations.
- (U) Integration/Interoperability. (\$3,300)
- (U) Continue to provide support and on-site Enhanced JTIDS System Exerciser (EJSE) operators for host platform developers and integrators.
- (U) Continue Affordability/Manufacturing Technology Demonstration (AMTD).

(U) FY 1995

- (U) Development Planning and Execution. (\$2,200)
- (U) Continue system integration and software development for E-3, E-8, F-15, RIVET JOINT, ABCCC, MAOC, and MCE platforms.

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<ul style="list-style-type: none"> - (U) Production Planning and Execution. (\$1,500) - (U) Prepare DAB materials and procurement package for contract award. - (U) Logistics. (\$3,578) - (U) Continue efforts to establish ISSA. - (U) Continue pre-operational support to terminal assets pending platform initial operational capability. - (U) Test/Demonstrations. (\$1,600) - (U) Verify MIP corrections and support E-8, ABCCC, and MCE development efforts. - (U) Support Air Force host platform participation in joint exercises in Ballistic Missile Defense demonstrations. - (U) Integration/Interoperability. (\$2,100) - (U) Continue to provide support and on-site EJSE operators for host platform developers and integrators. - (U) Continue AMTD with bench tests at Eglin AFB. 		
(U) <u>FY 1996</u>		
<ul style="list-style-type: none"> - (U) Development Planning and Execution. (\$2,200) - (U) Continue system integration and software development for E-3, E-8, F-15, RIVET JOINT, ABCCC, MAOC, and MCE platforms. - (U) Production Planning and Execution. (\$1,300) - (U) Review and establish second sources for obsolete parts and vanishing vendors. - (U) Engineering change activities associated with produceability and functional performance. - (U) Logistics. (\$2,246) - (U) Continue efforts to establish ISSA. - (U) Continue pre-operational support to terminal assets pending platform initial operational capability. - (U) Test/Demonstrations. (\$1,900) - (U) Verify MIP corrections and support E-8, ABCCC, and MCE development efforts. - (U) Support Air Force host platform participation in joint exercises in Ballistic Missile Defense demonstrations. - (U) Integration/Interoperability. (\$2,500) - (U) Continue to provide support and on-site EJSE operators for host platform developers and integrators. - (U) Investigate the impact of changes in operational concepts on the JTIDS network design process and the resulting interoperability of member platforms of a JTIDS network. 		
(U) <u>FY 1997</u>		
<ul style="list-style-type: none"> - (U) Development Planning and Execution. (\$2,200) - (U) Continue system integration and software development for E-3, E-8, F-15, RIVET JOINT, ABCCC, MAOC, and MCE platforms. - (U) Production Planning and Execution. (\$1,700) - (U) Review and establish second sources for obsolete parts and vanishing vendors. 		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

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- (U) Engineering change activities associated with produceability and functional performance.
- (U) Logistics. (\$2,394)
 - (U) Complete efforts to establish ISSA.
 - (U) Continue pre-operational support to terminal assets pending platform initial operational capability.
- (U) Test/Demonstrations. (\$1,600)
 - (U) Verify MIP corrections and support E-8, ABCCC, and MCE development efforts.
 - (U) Support Air Force host platform participation in joint exercises in Ballistic Missile Defense demonstrations.
- (U) Integration/Interoperability. (\$1,700)
 - (U) Continue to provide support and on-site EJSE operators for host platform developers and integrators.
 - (U) Continue to investigate the impact of changes in operational concepts on the JTIDS network design process and the resulting interoperability of member platforms of a JTIDS network.

(U) B. Program Change Summary (\$ in Thousands)

	FY 1994	FY 1995	FY 1996	FY 1997	Total Cost
(U) Previous President's Budget	16,113	11,634	14,198	13,643	265,814
(U) Appropriated Value	11,513	11,634			
(U) Adjustments to Appropriated Value	-154	-444			
a. General Congressional Reduction	1,838				
b. Below Threshold Reprogramming	-131	-212			
c. Small Business Innovative Research			-4,052	-4,049	
(U) Adjustments to Budget Years Since FY95 PB			10,146	9,594	
(U) Current Budget Submit/President's Budget	13,066	10,978	10,146	9,594	265,814

(U) Change Summary Explanation:

Funding: FY 94 was increased for Affordability/Manufacturing Technology Demonstration (AMTD). The FY 96-00 reductions of \$4 million per year, taken for higher priority Air Force requirements, delayed planned JTIDS demonstration and testing and implementation of network design.

(U) Schedule: Milestone III slipped from Feb 94 to Feb 95 due to the delay in Navy OPEVAL.

(U) Technical: None

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(U) C. Other Program Funding Summary (\$ in Thousands)

	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>To</u> <u>Compl</u>	<u>Total</u> <u>Cost</u>
(U) Other Proc AF, PE 27419F	1,900	4,100	4,900	0	0	0	0	0	0	10,900
(U) Other Proc AF, PE 27417F	3,400	11,600	12,700	21,600	0	0	0	0	0	49,300
(U) Other Proc AF, PE 27581F	6,300	5,200	4,700	4,300	3,200	3,300	3,400	0	1,700	32,100
(U) Other Proc AF, PE 27412F	0	16,200	0	0	0	0	0	0	0	16,200
(U) Other Proc AF, PE 35154F	0	0	1,500	4,800	3,600	5,100	5,100	5,200	0	25,300

Related RDT&E:

- (U)- Program Element #27130F F-15
(U)- Program Element #64770F E-8 (Joint STARS)
(U)- Program Element #27417F, E-3 (AWACS)
(U)- Program Element #27412F Modular Control Equipment (MCE)
(U)- Program Element #27412F Modular Air Operations Center (MAOC)
(U)- Program Element #27419F Airborne Battlefield Command and Control Center (ABCCC)
(U)- Program Element #35154F DARO.

(U) D. Schedule Profile

	FY 1994	FY 1995	FY 1996	FY 1997
(U) Acquisition Milestones				
- Milestone III FRP Class 2/2H	1 2	4 1	4 1	4 1
- LRIP Decision Class 2M		X	X	

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												FY 1995		FY 1996		FY 1997			
												1	2	3	4	1	2	3	4
(U) T&E Milestones																			
- OT-IID												X							
- MS OT-II																			
- F-15 OSP Complete*																			
- MCE IOT&E																X			
- JSTARS IOT&E																	X		
* Operational Special Project																			
(U) Contract Milestones																			
- LOT 5 LRIP Class 2/2H																			
- FRP Class 2/2H																			
- LRIP Class 2M																X			

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Exhibit R-2

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

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(U) A. Project Cost Breakdown (\$ in Thousands)

	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>
(U) Develop Planning/Execution	6,400	2,200	2,200	2,200
(U) Production Planning/Execution	500	1,500	1,300	1,700
(U) Logistics	2,166	3,578	2,246	2,394
(U) Integration/Interoperability	3,300	2,100	2,500	1,700
(U) Test/Demo	700	1,600	1,900	1,600
(U) Total	13,066	10,978	10,146	9,594

(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)

Performing Organizations:

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1994	Budget FY 1994	Budget FY 1995	Budget FY 1996	Budget FY 1997	Budget to Complete	Total Program
<u>Product Development Organizations</u>											
GEC-MARCONI	FFP	DEC 85	80,727	80,727	57,312	1,831	1,027	0	507	10,159	70,836
LOCKEED	FFP	JUN 93	3,373	3,373	2,085	1,288	0	0	0	0	3,373
GEC-MARCONI	FFP	JUN 93	850	850	698	152	0	0	0	0	850
CACD	FFP	JUN 93	1,072	1,072	720	352	0	0	0	0	1,072
MCAIR	CPFF	MAR 94	2,434	2,434	0	2,434	0	0	0	0	2,434
RADC	PO/616	VARIOUS	VARIOUS	VARIOUS	0	1,913	757	0	0	0	2,670
WR-ALC	PO/616	VARIOUS	VARIOUS	VARIOUS	512	893	1,104	927	635	0	4,071

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Exhibit R-3

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

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5 - Engineering And Manufacturing Development

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Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 1994	Budget FY 1994	Budget FY 1995	Budget FY 1996	Budget FY 1997	Budget to Complete	Total Program
NADEP	MIPR	VARIOUS	VARIOUS	VARIOUS	0	413	382	0	0	0	795
ACSI	FFP	SEP 94	445	445	0	445	0	0	0	0	445
<u>Support and Management Organizations</u>											
ESC	VARIOUS	VARIOUS	26,600	26,600	15,259	1,131	1,122	1,388	1,666	5,785	26,351
CONTRACTOR	VARIOUS	VARIOUS	52,457	52,457	35,375	366	1,649	3,031	2,686	9,350	52,457
SUPPORT											
MITRE	FPLOE	VARIOUS	89,854	89,854	68,875	1,715	4,604	4,800	4,100	15,900	99,994
<u>Test and Evaluation Organizations</u>											
MT HOME AFB	PO/616	VARIOUS	VARIOUS	VARIOUS	0	83	333	0	0	0	416
EGLIN AFB	PO/616	VARIOUS	VARIOUS	VARIOUS	0	50	0	0	0	0	50

(U) B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)

Government Furnished Property: NOT APPLICABLE

Subtotal Product Development	61,327	9,721	3,270	927	1,142	10,159	86,546
Subtotal Support and Management	119,509	3,212	7,375	9,219	8,452	31,035	178,802
Subtotal Test and Evaluation		133	333	0	0	0	466
Total Project	180,836	13,066	10,978	10,146	9,594	41,194	265,814

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1995
BUDGET ACTIVITY										PE NUMBER AND TITLE	
6 - Management Support										0604759F Major Test And Evaluation Investment	
	COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost		47,234	51,056	37,879	36,229	39,472	39,580	40,755	41,963	Continuing	TBD
3120 Air Force Development Test Center		14,142	15,883	11,546	10,161	16,317	17,218	19,675	17,627	Continuing	TBD
3285 Arnold Engineering Development Center		10,020	10,499	5,522	6,205	5,305	3,302	2,921	4,875	Continuing	TBD
3323 Cruise Missile Mission Control Aircraft		1,400	0	0	0	0	0	0	0	Continuing	10,600
3620 Air Force Flight Test Center		20,678	24,674	20,811	19,863	17,850	19,060	18,159	19,461	Continuing	TBD
4282 Developmental Manu. & Mod Facility		994	0	0	0	0	0	0	0	TBD	TBD

(U) **A. Mission Description and Budget Item Justification:** This Program Element (PE) provides planning, improvements, and modernization for test capabilities at three Air Force Test Centers: Arnold Engineering Development Center (AEDC), Air Force Development Test Center (AFDTC), and Air Force Flight Test Center (AFFTC). The purpose is to help test centers keep pace with emerging weapon system technologies. The fluctuations in the funding at these locations are due to changing priorities in the improvement and modernization requirements as defined through the AF Test Investment Planning & Programming Process and documented in the AF Test Investment Strategic Plan. Also, all projects have been reviewed through the Tri-Service Reliance effort (to communicate AF efforts to the other services and avoid unwarranted duplication of effort) and are documented in the Test Capability Master Plans. Further, each specific project has its own planning, development, equipment acquisition/facility construction, equipment installation, and checkout phases which often requires significant differences in funding from one year to the next. As such, the changes in funding from year to year do not necessarily indicate program growth but rather a planned phasing of improvement and modernization efforts. (For FY 96 only 17 or 124 validated projects are funded, which reflects the mandated downsizing of the DoD budget, not a change in requirements.) The test capabilities at these centers enable testing through all phases of weapon system acquisition from system concept exploration through component and full scale integrated weapon system testing to operational testing. These three test centers have over \$10B worth of unique test facilities/capabilities. They are a national asset operated and maintained by the Air Force for DoD test and evaluation missions, but they are available to others having a requirement for their unique capabilities.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

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BUDGET ACTIVITY

PE NUMBER AND TITLE

0604759F Major Test And Evaluation Investment

6 - Management Support

(U) B. Program Change Summary (\$ in Thousands):

(U) Previous President's Budget

(U) Appropriated Value

(U) Adjustments to Appropriated Value

a. Cong Gen Reductions

b. SBIR

c. Below Threshold Reprogramming

(U) Adjustments to budget years since FY 95 PB

(U) Current Budget Submit/President's Budget

FY 1994

50,798

-3,564

47,234

FY 1995

53,544

52,530

-1474

-969

FY 1996

61,009

-23,130

37,879

FY 1997

58,670

-22,371

36,299

Total Cost

Cont

(U) Change Summary Explanation:

Funding: For Air Force Development Test Center (3120), the following efforts have been zeroed in FY 96: PRIMES, Seeker T&E, Armament Systems Test Environment (ASTE), Range Data System, Mission Control/Data Analysis, and Climatic Test Facility. For Arnold Engineering Development Center (3285), the following efforts were canceled in FY 96: Weather erosion testing and J-4 Rocket Test Stand. For Developmental Manufacturing and Modification Facility (4282), FY 96/97 funding for this project has been zeroed.

Schedule: For Air Force Flight Test Center (AFFTC) (Proj 3620), Computer Aided Engineering/Computer Aided Manufacturing (CAE/CAM), Test Instrumentation, Concurrent Engineering, Digital Switch, Ground Time Space and Positioning Information (TSPI) upgrades, Advanced Test Data Management System (ATDMS), Scientific and Engineering Computer Acquisition Project (SECAP), and Advanced Test Bay System (ATBS) will be completed in FY 95 with reduced capability. Concurrent Engineering, Composite Aircraft Structures, Testbed Instrumentation, Airborne Sensor Upgrades, and Range Operational Control and Monitoring System (ROCMS) are unfunded and deferred. Advanced Radar Testbed (ARTB) was canceled due to funding cuts during FY 94 execution. Advanced Radar Instrumentation Aircraft (ARIA) Recording and Timing, and Local Range Network are not funded in FY 96 to 98. These projects are scheduled to resume activity in FY 99. For Developmental Manufacturing and Modification Facility (DMMF) (Proj 4282), efforts in FY 95 and out are on hold.

Technical: None.

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(U) C. Other Program Funding Summary (\$ in Thousands):

<u>1994</u>	<u>1995</u>
37,000	20,000

Appropriation: Military Construction,Budget Activity: Defense-Wide Mission Support,Program Title: McKinley Lab UpgradeAppropriation: Military Construction,Budget Activity: Defense-Wide Mission Support,Program Title: Hi-Temp Facility UpgradeAppropriation: Military Construction,Budget Activity: Defense-Wide Mission Support,Program Title: Weather Erosion Imp

Related RDT&E:

(U) PE 0604940D, Central Test & Evaluation Improvement Program

(U) PE 0604256F, Threat Simulator Development

(U) PE 0604735F, Combat Training Ranges

(U) D. Schedule Profile: Not applicable.

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BUDGET ACTIVITY

PE NUMBER AND TITLE

6 - Management Support

0604759F Major Test And Evaluation Investment

PROJECT

3120

	COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
3120	Air Force Development Test Center	14,142	15,883	11,546	10,161	16,317	17,218	19,675	17,627	Continuing	TBD

(U) **A. Mission Description and Budget Item Justification:** The Air Force Development Test Center (AFDTC), located at Eglin AFB, FL, conducts and supports developmental test and evaluation and operational test and evaluation of non-nuclear air armaments, electronic warfare systems, and target acquisition and weapon delivery systems; provides a climatic simulation capability; and determines target/test item electronic signatures. The Guided Weapon Evaluation Facility (GWEF) provides a full spectrum, multifunctional seeker/sensor laboratory test capability for all guided weapons. Common Airborne Instrumentation System (CAIS) Integration provides standardized airborne test to enhance interoperability and commonality. Global Positioning System (GPS) Range Systems will provide a major improvement for Time-Space-Position-Information (TSPI) at all MRTFBs and specifically at the Eglin Ranges for munitions testing. These projects ensure test center technology is compatible with weapon systems to be tested such as the Advanced Medium Range Air-to-Air Missile (AMRAAM), Joint Direct Attack Munition (JDAM), AGM-130, Advanced Short Range Air-to-Air Missile (ASRAAM), Joint Tactical Information Distribution System (JTIDS), Joint Surveillance and Target Attack Radar System (Joint STARS), Combat Talon, etc.

(U) FY 1994 Program:

- (U) The Preflight Integration of Munitions and Electronic Systems (PRIMES) provides the instrumentation to conduct preflight checkout of total integrated weapon systems in a secure anechoic chamber. PRIMES completed the second phase of the GWEF/PRIMES link to provide interoperability between PRIMES and GWEF to allow the aircraft to "fly" in PRIMES and "launch" its munitions in GWEF to simulate an open air flight test. (\$2,403)
- (U) GWEF began procuring equipment to support GPS simulation. Software development began to utilize the distribution network to support dual mode seeker testing. Continued acquisition of the Infrared Target Generator (IRTG). (\$1,100)
- (U) Seeker T&E provides ground and airborne test instrumentation support for infrared (IR), millimeter wave (MMW), and laser weapon RDT&E programs. Seeker T&E continued development of MMW radar, consolidation of IR pods, and complete procurement of a second ground/airborne IR pod. This pod provides signature measurement data capabilities to support tri-service test requirements. (\$1,120)
- (U) The Armament Systems Test Environment (ASTE) Range Systems effort upgrades instrumentation of the major data collection systems supporting munitions test requirements. ASTE Range Systems continued to provide test support with upgrades and modernization of Cine-T, range telemetry, and photo-optics and ultra high-speed video. (\$2,405)
- (U) CAIS integration procured bench instrumentation and continue upgrades to preflight support equipment. (\$1,000)
- (U) GPS Range Systems began data link acquisition and equipment integration, and initiated integrated TSPI range efforts to incorporate Range Applications Joint Program Office (RAJPO) equipment. (\$4,036)
- (U) Continued work on the following projects (less than \$1,000 each): Range Data Systems instrumentation, Mission Control/Data Analysis, and Climatic Test Facility equipment. (\$2,078)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
6 - Management Support	0604759F Major Test And Evaluation Investment	3120	
<p>(U) <u>FY 1995 Planned Program:</u></p> <ul style="list-style-type: none">- (U) PRIMES will complete the third phase of the GWEF/PRIMES link, (advanced scenario simulators) and complete the procurement of data analysis and complete the radio frequency (RF) Spectrum Monitor/Verification System and initiate efforts Reactive Loop. (\$1,375)- (U) GWEF will continue acquisition of the IR Target Generator, begin software development to utilize the distribution network to support multimode seeker testing, start procurement of a multi-mode test capability to simultaneously control two test area scene generators and real-time simulations, and begin procurement/installation of a wide band, digital RF memory to support MMW simulation. (\$1,940)- (U) Seeker T&E will complete IR Pod Consolidation. This effort combines the capabilities of two instrumentation pods into one, allowing it to support all test scenarios. Continue procurement of MMW Instrumentation and Electro-Optical (EO)/Infrared (IR)/Laser Support Systems. (\$1,205)- (U) ASTE Range Systems will continue Cine-T Encoder Upgrades, Central Timing Upgrades to replace Loran C Time Code Generators (TCGs), provide six sites with high speed/ultra high speed video, begin replacement of four transportable microwave antenna towers, and upgrade Range telemetry. (\$3,094)- (U) Mission Control/Data Analysis will continue procurement of data display equipment for the classified mission control rooms to provide full mission capability, complete acquisition of the video data analysis system and procure a computer for real-time network upgrade. (\$1,123)- (U) GPS Range Integration will continue data link acquisition and equipment integration, and integrated TSPI range efforts to incorporate RAJPO equipment. (\$3,676)- (U) Common Airborne Instrumentation System (CAIS) will continue procurement and installation of Standard Aircraft Instrumentation kits to promote compatibility and range interoperability, and shorten test preparation time. Will continue acquisition of support equipment to upgrade ground stations, purchase portable TIMS units, and update Computer Aided Design (CAD) systems. Will acquire pre-production CAIS units for bench mock-ups. (\$2,305)- (U) Continued work on the following projects (less than \$1,000 each): Climatic Test Facility upgrades and Range Data System upgrades. (\$1,165) <p>(U) <u>FY 1996 Planned Program:</u></p> <ul style="list-style-type: none">- (U) CAIS integration will procure CAIS production units to provide commonality and interoperability to aircraft instrumentation. Continue acquisition of support equipment for ground stations, portable Test Instrumentation Management System (TIMS) equipment, and CAD system upgrades. (\$5,745)- (U) GWEF will develop software and hardware to control and generate multimode targets for real-time Hardware-in-the-loop (HITL), continue acquisition of the Radio Frequency Interference (RFI) MMW simulation capability, complete the IR target generator and begin development of a multispectral man-in-the-loop test capability. (\$3,627)- (U) GPS Range integration will continue data link acquisition and integration of RAJPO equipment to fully implement GPS architecture on Eglin Test Ranges. (\$2,174) <p>(U) <u>FY 1997 Planned Program:</u></p> <ul style="list-style-type: none">- (U) Continue procurement of CAIS equipment. (\$5,045)- (U) GWEF will complete the multimode and MMW/RF simulator programs and continue the multispectral man-in-the-loop development. (\$3,096)- (U) Continue procurement of GPS instrumentation for surface and aerial targets. (\$2,020)			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

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PE NUMBER AND TITLE

6 - Management Support

0604759F Major Test And Evaluation Investment

PROJECT

3120

(U) B. Program Change Summary (\$ in Thousands):

Total	<u>Cost</u>	Cont
100	80	20
90	72	18
80	64	16
70	56	14
60	48	12
50	40	10
40	32	8
30	24	6
20	16	4
10	8	2
0	0	0

(U) Previous President's Budget

FY 1997
18,291

(U) Appropriated Value

FY 1996
20,624

<u>FY 1995</u>	
16,604	
16,604	

(U) Adjustments to Appropriated Value

a. Cong Gen Reductions

-721
-306

c. Below Threshold Reprogramming

-1,315

(U) Adjustments to budget years since FY 95 PB

-9,078	-8,130
11,546	10,161

Cont

(U) Change Summary Explanation:

Funding: The following efforts were zeroed in FY 96: PRIMES, Seeker T&E, ASTE, Range Data System, Mission Control/Data Analysis, and Climatic Test Facility.

Schedule: None.

Technical: None.

(U) C. Other Program Funding Summary (\$ in Thousands):

<u>1994</u>	<u>1995</u>
37,000	20,000

Appropriation: Military Construction.

Budget Activity: Defense-Wide Mission Support,

Program Title: McKinley Lab Upgrade

Related RDT&E:

(U) PE 0604940D, Central Test & Evaluation Improvement Program

(U) PF 0604256F. Threat Simulator Development

(U) PE 0604735F, Combat Training Ranges

(U) D. Schedule Profile: Not applicable

<u>Compl</u>	<u>Cost</u>
N/A	62,000

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
6 - Management Support		0604759F Major Test And Evaluation Investment								3285	
COST (in Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
3285	Arnold Engineering Development Center	10,020	10,499	5,522	6,205	5,305	3,302	2,921	4,875	Continuing	TBD

(U) A. Mission Description and Budget Item Justification: The Arnold Engineering Development Center (AEDC), Arnold AFB, TN, provides ground environmental test support for DoD aeronautical, missile, and space programs. The center has 53 test facilities providing: aerodynamic testing of scale model aircraft, missile, and space systems; testing of large and full-scale satellites, sensors, and space vehicles in a simulated space environment; altitude environmental testing for aircraft, missile, and spacecraft propulsion systems; and testing of large-scale models such as space boosters together with their propulsion systems. The AEDC Data Acquisition and Processing System provides processing capability for advanced turbine engine testing on programs like the F-22. This effort also upgrades data systems for the arc heaters and hypervelocity gun facility for Theater High Altitude Air Defense (THAAD) testing. Inefficiencies in these current data systems result in increased program costs and schedule delays. The Computer Aided Design/Computer Aided Manufacturing (CAD/CAM) project will provide increased capability for data processing and storage and provide wider availability of workstations. The Fighter Engine Test Capability will upgrade engine test cells to accommodate higher thrust engines with axisymmetric vectored exhaust nozzles.

(U) FY 1994 Program:

- (U) Continued J-6 project support in technical and management oversight of construction, technical support to construction contractor, base support services, and operations and maintenance. Continued site activation/validation. (\$3,150)
- (U) Continued AEDC Data Acquisition and Processing System (DAPS) with installation of additional work stations/processors. The capability will support all tri-Service large turbine engine development testing as agreed to by the OSD Test Reliance effort. (\$3,852)
- (U) Continued work on the following projects (less than \$1,000 each): Computer Aided Design/Computer Aided Manufacturing upgrades (CAD/CAM), Engine Test Facility upgrades, weather/erosion testing upgrades, J-4 liquid rocket testing, Range-G Flyer Plate upgrade, and ballistic range upgrades. (\$3,018)

(U) FY 1995 Planned Program:

- (U) Complete IOC of J-6 project. (\$1,065)
- (U) Continue AEDC DAPS with acquisition and installation of additional work stations/processors. (\$4,657)
- (U) Continue purchase of additional CAD/CAM work stations. (\$2,033)
- (U) Fabricate and continue upgrade of the J-4 Cryogenic Liquid Rocket Test Capability. (This project will be completed using customer funds.) (\$1,724)
- (U) Continued work on the following projects (less than \$1,000 each): T-7 Control System, increased thrust rating of the T-Cells for the ongoing Fighter Engine Test capability upgrade, and continued studies of existing test capabilities used for weather erosion testing. (\$1,020)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

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BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

6 - Management Support

0604759F Major Test And Evaluation Investment

3285

- (U) FY 1996 Planned Program:
- (U) Complete installation of the Engine Test Facility portion of the DAPS. Complete design and procure system equipment for the engine test cells. Complete upgrades to all Engine Test Facility data analysis areas. (\$3,789)
 - (U) Complete IOC of Phase I of CAD/CAM (replacement of current system). (\$1,733)
- (U) FY 1997 Planned Program:
- (U) Continue AEDC DAPS with acquisition and installation of additional work stations/processors in the engine test cells. (\$3,669)
 - (U) Continue purchase of additional CAD/CAM work stations. (\$1,508)
 - (U) Provide exhaust gas management capability improvements in the Engine Test Facility J-cells, directed toward simulated altitude testing of higher thrust turbine engines with axisymmetric vectoring nozzles. IOC of the entire fighter engine test cells will be achieved for both T- and J-cells. (\$1,028)

(U) B. Program Change Summary (\$ in Thousands):

	FY 1994	FY 1995	FY 1996	FY 1997	Total
(U) Previous President's Budget	10,924	10,499	7,690	8,106	Cost
(U) Appropriated Value		10,499			Cont
(U) Adjustments to Appropriated Value					
a. SBIR		-194			
b. Below Threshold Reprogramming	-904				
(U) Adjustment to budget years since FY 95 PB			-2,170	-1,901	
(U) Current Budget Submit/President's Budget	10,020	10,499	5,522	6,205	Cont

(U) Change Summary Explanation:

Funding: The following efforts were canceled in FY 96: Weather erosion testing, and J-4 Rocket Test Stand.

Schedule: None.

Technical: None.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1995																														
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT																															
6 - Management Support		0604759F Major Test And Evaluation Investment								3323																															
COST (In Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost																														
3323	Cruise Missile Mission Control Aircraft	1,400	0	0	0	0	0	0	0	Continuing	10,600																														
<p>(U) <u>A. Mission Description and Budget Item Justification:</u> The Cruise Missile Mission Control Aircraft (CMMCA) will consolidate telemetry support, mission control functions, radar safety chase, and flight following capabilities into a single airborne platform. As such, CMMCA will replace visual safety chase for most cruise missile test missions resulting in significant savings.</p> <p>(U) <u>FY 1994 Program:</u></p> <p>- (U) Conducted final systems flight testing and deliver a/c #893 (IOC) and a/c #895 (FOC). Program completed in FY 94. (\$1,400)</p> <p>(U) <u>FY 1995 Planned Program:</u></p> <p>- (U) Not applicable.</p> <p>(U) <u>FY 1996 Planned Program:</u></p> <p>- (U) Not applicable.</p> <p>(U) <u>FY 1997 Planned Program:</u></p> <p>- (U) Not applicable.</p> <p>(U) <u>B. Program Change Summary (\$ in Thousands):</u></p> <table border="0"> <tr> <td></td> <td>FY 1994</td> <td>FY 1995</td> <td>FY 1996</td> <td>FY 1997</td> <td>Total</td> </tr> <tr> <td>(U) Previous President's Budget</td> <td>1,400</td> <td>0</td> <td>0</td> <td>0</td> <td>Cost</td> </tr> <tr> <td>(U) Appropriated Value</td> <td></td> <td></td> <td></td> <td></td> <td>N/A</td> </tr> <tr> <td>(U) Adjustments to Appropriated Value</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>(U) Current Budget Submit/President's Budget</td> <td>1,400</td> <td>0</td> <td>0</td> <td>0</td> <td>N/A</td> </tr> </table>													FY 1994	FY 1995	FY 1996	FY 1997	Total	(U) Previous President's Budget	1,400	0	0	0	Cost	(U) Appropriated Value					N/A	(U) Adjustments to Appropriated Value						(U) Current Budget Submit/President's Budget	1,400	0	0	0	N/A
	FY 1994	FY 1995	FY 1996	FY 1997	Total																																				
(U) Previous President's Budget	1,400	0	0	0	Cost																																				
(U) Appropriated Value					N/A																																				
(U) Adjustments to Appropriated Value																																									
(U) Current Budget Submit/President's Budget	1,400	0	0	0	N/A																																				

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
6 - Management Support	0604759F Major Test And Evaluation Investment	3323	
<p>(U) Change Summary Explanation: Funding: None.</p> <p>Schedule: None.</p> <p>Technical: None.</p> <p>(U) C. <u>Other Program Funding Summary (\$ in Thousands)</u>: Not applicable.</p> <p>(U) D. <u>Schedule Profile</u>: Not applicable.</p>			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

6 - Management Support

0604759F Major Test And Evaluation Investment

3620

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
3620 Air Force Flight Test Center	20,678	24,674	20,811	19,863	17,850	19,060	18,159	19,461	Continuing	TBD

(U) A. Mission Description and Budget Item Justification: The Air Force Flight Test Center (AFFTC), located at Edwards AFB, conducts and supports developmental test and evaluation and operational test and evaluation of aircraft and aircraft systems, aerospace research vehicles, unmanned miniature vehicles, cruise missiles, parachutes delivery/recovery systems, and cargo-handling systems. The AF Common Airborne Instrumentation System Integration & Support (CAIS I&S), a joint effort by the Air Force Development Test Center (AFDTC) and AFFTC, supports DoD objectives for interoperability/commonality. The goal of CAIS I&S is to integrate CAIS equipment and supporting instrumentation equipment and systems to provide a full airborne instrumentation operational capability. The Advanced Data Acquisition and Processing Systems (ADAPS) project provides an integrated capability to satisfy real-time first generation post-test data processing, archival, and display requirements through the 1990s. The developmental approach is directed towards providing a high degree of interoperability between systems and components by adherence to Air Force and DoD guidelines. The technologies being developed under ADAPS have the potential to satisfy data processing and display needs at various multi-service test ranges. The AF Global Positioning System (GPS) Range Applications Joint Program Office (RAJPO) Equipment project provides funding for the purchase of production GPS equipment developed by the RAJPO (OSD funded) for tri-service application. The Space Based Data Relay (SBDRL) project provides the capability for Advanced Radar (Instrumentation Aircraft (ARIA) to fulfill customer needs for real time, high-speed data, and greatly improve the overall range data relay capability. The ARIA Extended S-Band Telemetry upgrade ensures the compatibility of the ARIA with the Expendable Launch Vehicles (ELV) and major DoD ranges.

(U) FY 1994 Program:

- (U) Commenced GPS RAJPO full-rate production equipment procurement (contract award 2nd quarter). Conducted operational testing and integration for first GPS RAJPO production units. All three services will be purchasing this Time Space and Positioning Information (TSPI) system. (\$6,782)
- (U) Continued development of an ADAPS real-time/post flight processing (RT/PPF) capability. This will provide a high rate, high throughput, graphical display capability to support the initial real-time requirements of the F-22 and other AFFTC test programs. The following are planned accomplishments for FY 94: System Requirements Review, System Design Review, Preliminary Review, Milestone II approval, and Critical Design Review. (\$5,542)
- (U) Conducted the Automated Test Data Management System (ATDMS) final development and testing of an automated set-up prototype for the ADAPS systems. ATDMS provides an automated way of setting up ADAPS, and also track, with a data base, all setup information. It integrates test planning together with automated setup. The following are planned accomplishments for FY 94: Milestone I approval, System Requirements Review, and Milestone II approval. ATDMS provides an automated capability to manage the vast amount of test information required to plan and conduct a test. (1,294)
- (U) Continued CAIS I&S development by integrating the initial CAIS data acquisition units with TIMS as CAIS units become available. (This system has been endorsed by the CAIS JPO as the high and ground support system for CAIS.) IOC of TIMS for initial CAIS support is planned for 4Q FY 94. Completed development of a transportable (box) version of TIMS. Began setting up a logistics support structure, and procurement of quick reaction kits. (\$2,576)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	PROJECT
BUDGET ACTIVITY			
6 - Management Support		0604759F Major Test And Evaluation Investment	February 1995 3620
PE NUMBER AND TITLE			
<ul style="list-style-type: none"> (U) Continued upgrades to several projects (less than \$1,000 each): Digital switch, Advanced Tracker System, Edwards Local Range Network, Test and Evaluation Mission Simulator, CAE/CAM hardware/software, Test Instrumentation project, Avionics Test Bay Systems, Utah Test and Training Range Time-Space Position Indicator system, Advanced Range Instrumentation Aircraft, and Command directed efforts (\$4,484) 			
(U) FY 1995 Planned Program:			
<ul style="list-style-type: none"> (U) Continue procurement of RAJPO GPS equipment. (\$2,770) (U) Continue Edwards Local Range Network development with further expansion of base fiber optic backbone. Begin development of the ATM Network and the Network Operations Center. (\$1,226) (U) Finish the development, installation, and IOC of the first ADAPS RT/PPF system. This system is critical for supporting the real-time requirements of the F-22. Begin development of a mass storage and data base capability. This system will eventually replace the 65,000 nine-track tapes currently being stored at the AFFTC. The following are planned accomplishments for FY 95: ADAPS system installation, Test Readiness Review, and IOC of first system. (\$5,161) (U) Under the ATDMS project, complete development of the first automated data setup in support of the ADAPS RT/PPF system. Provide an interface to the TIMS. The following are planned accomplishments for FY 95: Preliminary Design Review, Critical Design Review, and IOC of first system for data setup. (\$1,440) (U) Continue CAIS I&S development. Release version 3.0 of the TIMS software to support CAIS (depending on the availability of CAIS). Award requirements contract for data recorder, and continue procurement of quick reaction kits. Award requirements contract for TIMS ground support equipment. (\$4,326) (U) Begin equipment purchase and T-2 Mod Design for the ARIA Space Based Data Relay System program. (\$5,806) (U) Continue the ARIA Extended S-Band program with purchase of equipment and modification first aircraft. (\$1,200) (U) Continued upgrades to several projects (less than \$1,000 each): Digital Switch, Scientific and Computer Acquisition Project, Test Instrumentation Project, CAE/CAM, and ATBS. (\$2,745) 			
(U) FY 1996 Planned Program:			
<ul style="list-style-type: none"> (U) Continue CAIS I&S development. Complete CAIS diagnostic bench integration. Purchase CAIS low rate data recorder initial spares. Complete TIMS integration with CAIS (assumes availability of CAIS units). (\$6,533) (U) Install and integrate the second ADAPS RT/PPF system. This system is critical for supporting F-22 test requirements. Procure the first mass storage archive system to replace nine track tapes currently being used. (\$5,935) (U) Continue purchase of RAJPO GPS equipment. Conduct acceptance testing of GPS equipment purchased in FY 95. (\$3,921) (U) Continue ARIA Space Based Data Relay System program. Complete non-recurring engineering work on system design and T-2 aircraft modification. Commence equipment installation and aircraft modification. (\$2,812) (U) Continue the ARIA Extended S-Band program equipment installation and aircraft #1 modification. (\$1,610) 			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

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BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

6 - Management Support

0604759F Major Test And Evaluation Investment

3620

- (U) FY 1997 Planned Program:
- (U) Continue ARIA Space Based Data Relay program. Continue equipment installation/fabrication and #2 aircraft modification. (\$6,835)
 - (U) Continue CAIS I&S development. Purchase CAIS components for AFFTC use. Continue TIMS development with automated setup of systems, automated diagnostics, and simulation capability. Begin development of a CAIS optical bus interface unit. (\$5,447)
 - (U) FOC of ADAPS RT/PPF. Procure second mass storage archive system. Begin integration of ADAPS with ground test simulation capabilities. (\$4,943)
 - (U) Continue the ARIA Extended S-Band equipment installation and modification on second aircraft. (\$1,758)
 - (U) Complete the purchase of integration of RAJPO GPS equipment. (\$880)

(U) B. Program Change Summary (\$ in Thousands):

	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>	Total
(U) Previous President's Budget	21,658	25,427	31,595	31,166	<u>Cost</u>
(U) Appropriated Value		25,427			Cont
(U) Adjustments to Appropriated Value					
a. Cong Gen Reductions		-753			
b. SBIR		-469			
c. Below Threshold Reprogramming	-980				
(U) Adjustments to budget years since FY 95 PB			-10,784	-11,183	
(U) Current Budget Submit/President's Budget	20,678	24,674	20,811	19,983	Cont

(U) Change Summary Explanation:

Funding: Reductions taken during FY 96 POM build (\$10,874 - FY 96; \$11,183 - FY 97).

Schedule: Computer Aided Engineering/Computer Aided Manufacturing (CAE/CAM), Test Instrumentation, Concurrent Engineering, Digital Switch, Ground Time Space and Positioning Information (TSPI) upgrades, Advanced Test Data Management System (ATDMS), Scientific and Engineering Computer Acquisition Project (SECAP), and Advanced Test Bay System (ATBS) will be completed in FY 95 with reduced capability. Concurrent Engineering, Composite Aircraft Structures, Testbed Instrumentation, Airborne Sensor Upgrades, and Range Operational Control and Monitoring System (ROCMS) are unfunded and deferred. Advanced Radar Testbed (ARTB) was canceled due to funding cuts during FY 94 execution. Advanced Range Instrumentation Aircraft (ARIA) Recording and Timing, and Local Range Network are not funded in FY 96 to 98. These projects are scheduled to resume activity in FY 99.

Technical: None.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
6 - Management Support	0604759F Major Test And Evaluation Investment	3620
<p>(U) C. <u>Other Program Funding Summary (\$ in Thousands):</u></p> <p>(U) Related RDT&E:</p> <p>(U) PE 0604940D, Central Test & Evaluation Improvement Program</p> <p>(U) PE 0604256F, Threat Simulator Development</p> <p>(U) PE 0604735F, Combat Training Ranges</p> <p>(U) D. <u>Schedule Profile:</u> Not applicable.</p>		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

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BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

6 - Management Support

0604759F Major Test And Evaluation Investment

4282

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
4282 Developmental Manu. & Mod Facility	994	0	0	0	0	0	0	0	TBD	TBD

(U) **A. Mission Description and Budget Item Justification:** This project provides for engineering design and analysis, fabrication, and aircraft modification support to the AF MRTFB. The DMMF accomplishes structural, electrical, and/or aerodynamic aircraft modifications to support the installation of systems and components for flight test; fabrication and installation of flight test instrumentation; installation, support, and upgrade of aircraft test bed projects; and engineered demodifications of test projects.

(U) FY 1994 Program:

- (U) Continued upgrade of T&E aircraft modification and manufacturing equipment. (\$400)
- (U) Continued upgrade of computer aided engineering equipment. (\$400)
- (U) Continued upgrade of computer integrated manufacturing equipment. (\$194)

(U) FY 1995 Planned Program:

- (U) None. Funds denied by Congress.

(U) FY 1996 Planned Program:

- (U) None.

(U) FY 1997 Planned Program:

- (U) None.

(U) **B. Program Change Summary (\$ in Thousands):**

	FY 1994	FY 1995	FY 1996	FY 1997	Total Cost N/A
(U) Previous President's Budget	1,076	1,014	1,100	1,107	
(U) Appropriated Value		0			
(U) Adjustments to Appropriated Value			-1,100	-1,107	
(U) Adjustment to budget years since FY 95 PB	994	0	0	0	N/A
(U) Current Budget Submit/President's Budget					

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
6 - Management Support	0604759F Major Test And Evaluation Investment	4282	
<p>(U) Change Summary Explanation: Funding: The FY 95 funds were denied by Congress. The FY 96/97 funding for this project has been zeroed.</p> <p>Schedule: Because of above cuts, efforts in FY 95 and out are on hold.</p> <p>Technical: None.</p> <p>(U) C. <u>Other Program Funding Summary (\$ in Thousands)</u>: Not applicable.</p> <p>(U) D. <u>Schedule Profile</u>: Not applicable.</p>			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE		February, 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT			
5 - Engineering And Manufacturing Development		0604770F Joint STARS								3551			
COST (In Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost		
3551	JSTARS	278,807	168,989	169,702	200,382	194,822	47,986	49,416	50,885	Continuing	TBD		
<p>(U) <u>A. Mission Description and Budget Item Justification</u></p> <p>There is an Air Force and Army need to provide, from airborne platforms, near-real-time surveillance and targeting information on moving and stationary ground targets (growth to maritime operations), slow moving rotary and fixed-wing aircraft, and rotating antennas. This information would enable operational and tactical commanders to make and execute battle decisions. To meet these needs, the Air Force and Army initiated the Joint Surveillance Target Attack Radar System (Joint STARS) program with the Air Force as lead service. Joint STARS will be capable of providing target information for pairing direct attack aircraft and standoff weapons against selected targets. The system will be capable of being cued by other reconnaissance, surveillance, and target acquisition systems; able to respond rapidly to worldwide contingencies; and provide surveillance and attack information in all light and near-all-weather conditions. The operational utility of the system was effectively demonstrated by the outstanding performance of the two developmental aircraft in support of combat operations during Desert Storm. The program is in the Budget Activity/Research Category of Engineering and Manufacturing Development. A Defense Acquisition Board (DAB) Milestone III (Full Rate Production) is planned for 4Q FY96.</p> <p>(U) <u>FY 1994</u></p> <ul style="list-style-type: none"> - (U) Completed residual test activities and award fees on E-8A development. (7,318) - (U) Continued E-8C follow-on development. (101,631) - (U) Continued Ground Support Systems (GSS) and Self Defense Suite (SDS) Development (67,920) - (U) Started Crew Trainers development (9,622) - (U) Started Post Development Test Support (PDTS) Contract Effort (28,595) - (U) Continued Government Furnished Equipment (GFE), program support, test, and other miscellaneous efforts (63,721) <p>(U) <u>FY 1995</u></p> <ul style="list-style-type: none"> - (U) Continue E-8C follow-on development and testing program (41,004) - (U) Continue GSS, SDS, PDTS and Crew Trainers Development (79,110) - (U) Continue GFE, program support, test, and other miscellaneous efforts (48,875) <p>(U) <u>FY 1996</u></p> <ul style="list-style-type: none"> - (U) Continue E-8C follow-on development and testing program (26,762) - (U) Continue GSS and SDS Development (89,858) - (U) Continue Crew Trainers Development (5,928) 													

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)			DATE	PROJECT
BUDGET ACTIVITY	PE NUMBER AND TITLE			
5 - Engineering And Manufacturing Development	0604770F Joint STARS		February, 1995	3551
- (U) Complete Post Development Test Support (PDTS) contract (10,370)				
- (U) Continue Government Furnished Equipment (GFE), program support, test, and other miscellaneous efforts (36,784)				
(U) FY 1997				
- (U) Continue E-8C follow-on development and testing program (30,526)				
- (U) Continue Ground Support Systems (GSS) and development (127,190)				
- (U) Complete Crew Trainer Development (5,316)				
- (U) Complete PDTS Residual efforts (1,460)				
- (U) Continue GFE, program support, test, and other miscellaneous efforts (35,890)				
(U) B. <u>Program Change Summary (\$ in Thousands)</u>				
(U) Previous President's Budget	FY 1994	FY 1995	FY 1996	FY 1997
(U) Appropriated Value	295,228	190,408	170,573	201,407
(U) Adjustments to Appropriated Value	288,728	175,408		
a. General Congressional Reductions	(5,657)	(3,148)		
b. Small Business Innovation Research	(3,255)	(3,271)		
c. Below Threshold Reprogrammings	(1,009)			
(U) Adjustments to Budget Years Since FY95			(871)	(1,025)
(U) Current Budget Submit/President's Budget	278,807	168,989	169,702	200,382
				TBD
(U) Change Summary Explanation:				
Funding: Reductions to FY96 (871) and FY97 (1,025) were to Non-Pay Purchases Inflation.				
Schedule:				
Technical:				

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

BUDGET ACTIVITY	PE NUMBER AND TITLE	DATE	PROJECT
5 - Engineering And Manufacturing Development	0604770F Joint STARS	February, 1995	3551

(U) C. Other Program Funding Summary (\$ in Thousands)

	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	To Compl	Total Cost
(U) Aircraft Procurement AF, BA 04, 06; PE 0207581F	558,705	687,762	556,264	585,937	554,065	536,679	513,738	484,433	70,900	4,548,483
Quantities	2	2	2	2	2	2	2	3		17
(U) Military Construction; PE 0604770F	24,400	14,300	6,900	25,850	24,280					95,730

Related RDT&E:

(U) The Army Joint STARS Ground Station Module (GSM) program is funded under the Army Joint STARS Program (PE 0604770A).

(U) D. Schedule Profile

	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 1997
(U) MCTC Start	1	2	3	4	1	2	3	4	2
(U) TADIL-J Award	X*								3
(U) PDTS Contract Award									
(U) Flight Crew Training Award									
(U) Software Support Facility Delivery									
(U) Flight/Mission Simulator Delivery									
(U) FSD Development Test Complete									
(U) DT&E Complete (FOFSD)									
(U) OT&E Begins (FOFSD)									
(U) MOT&E Start									
(U) MOT&E Complete									
(U) Milestone III									
(U) Full Rate Production Contract Awd									
(U) 1st A/C Delivery to ACC									

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE _____

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

5 - Engineering And Manufacturing Development

0604770F Joint STARS

PROJECT
3551

	FY 1994	FY 1995	FY 1996	FY 1997
(U) 1st Training Squad Ready for Trng	1 2 3 4	1 2 3 4	1 2 X X X	1 2 3 4
(U) Depot Support Date				
(U) 1st SDS Installation (Group A)			X	
(U) Required Assets Availab. (RAA)			X	
(U) Organic Support Capability			X	
(U) IOC				X
(U) PDTS Complete				X

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

5 - Engineering And Manufacturing Development

0604770F Joint STARS

3551

(U) A. Project Cost Breakdown (\$ in Thousands)

	FY 1994	FY 1995	FY 1996	FY 1997
(U) Product Development	191,376	107,284	123,202	163,502
(U) Support and Management	45,176	37,153	27,105	26,734
(U) Test and Evaluation	42,255	24,552	19,395	10,146
(U) Total	278,807	168,989	169,702	200,382

(U) B. Budget Acquisition History and Planning Information (\$ in Thousands)

Performing Organizations:

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Perform Activity EAC	Project Office EAC	Total Prior to FY 1994	Budget FY 1994	Budget FY 1995	Budget FY 1996	Budget FY 1997	Budget to Complete	Total Program
<u>Product Development Organizations</u>											
GMDS	C/FPI	Sep 85	1,156,200	1,156,200	955,497	7,318					962,815
F19628-85-C-0053											
GMDS	SS/CPIF	Nov 90	898,428	898,428	620,260	125,014	54,419	44,842	19,456	34,437	898,428
F19628-90-C-0197											
GMDS	SS/CPIF	Oct 93	25,662	25,662	25,662						25,662
F19628-91-C-0034											
Bocing	SS/FP	Jan 83	95,617	95,617	95,583	34					95,617
N0001983C0176											
GMDS	SS/CPIF	Oct 93	163,639	163,639	6,510	38,953	28,514	23,113	40,445	26,104	163,639
F19628-93-C-0067											
SDS Studios		Ongoing			1,797	3,493	211				5,501
Various Contracts											

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	PROJECT
BUDGET ACTIVITY											3551
5 - Engineering And Manufacturing Development										Joint STARS	
Contract or	Method/Type	Award or	Perform	Project	Total	Budget	Budget	Budget	Budget	Budget	Total
Government	or Funding	Obligation	Activity	Office	Prior to	FY 1994	FY 1995	FY 1996	FY 1997	Complete	Program
Activity	Vehicle	Date	EAC	EAC	FY 1994	FY 1994	FY 1995	FY 1996	FY 1997		
Constant Source	TBD	TBD	TBD	TBD		1,909	11,123	23,962	15,216		52,210
Computer Res Spt	TBD	TBD	TBD	TBD				24,703	64,099	40,396	129,198
Dual and Assoc	SS/CPAF/FFP	May 94	10,512	10,512	204	5,535	2,778	1,784	211		10,512
F33657-93-C-0046											
Maint Trainers	VARIOUS		21,946	21,946	191	4,003	8,713	4,039	5,000		21,946
Product Improve	TBD	TBD	TBD	TBD					18,500	146,362	164,862
<u>Support and Management</u>											
MITRE		Ongoing			114,205	14,375	10,904	9,700	9,000	27,880	186,064
F19628-85-C-0001											
TEMS - Various		Ongoing			59,970	7,520	7,570	7,820	8,078	30,333	121,291
INFOTEC	C/FP	Apr 85	Ongoing		32,110	3,461	2,587				38,158
F19628-85-C-0022											
Other Spt & Mgmt					95,220	19,820	16,092	9,585	9,656	20,998	171,371
<u>Test and Evaluation Property</u>											
3246 TESTW, PO					17,318	3,510	1,080	1,040	1,040	3,845	27,833
Eglin AFB-Range											
Spt - PO					9,961	443					10,404
Elect Technical	MIPR										
Lab - RVAN											
PDTs	SS/FFP	Jun'94	52,965	52,965	78	28,595	13,422	9,900	970		52,965
F19628-94-C-0040											
Flight Test Spt	TBD	TBD	TBD	TBD	26,039	7,844	9,074	470	490	1,460	2,840
JTF Spt	Allotment				19,085	1,863	556	7,915	7,576	10,718	69,166
Other Test Spt		Ongoing						70	70	140	21,784

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

5 - Engineering And Manufacturing Development

0604770F Joint STARS

PROJECT

3551

(U) B. Budget Acquisition History and Planning Information Continued (\$ in Thousands)

Government Furnished Property:

Item Description	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Delivery Date	Total Prior to FY 1994	Budget FY 1994	Budget FY 1995	Budget FY 1996	Budget FY 1997	Budget to Complete	Total Program
<u>Product Development Property</u>										
JTIDS			Ongoing	14,055	2,946	1,181	484	300	186	19,152
GMSD	VARIOUS		Ongoing	607	2,171	345	275	275	250	3,923
<u>Support and Management Property</u>										
<u>Test and Evaluation Property</u>										
Subtotal Product Development										
Subtotal Support and Management										
Subtotal Test and Evaluation										
Total Project										
				1,720,366	191,376	107,284	123,202	163,502	247,735	2,553,465
				301,505	45,176	37,153	27,105	26,734	79,211	516,884
				72,481	42,255	24,552	19,395	10,146	16,163	184,992
				2,094,352	278,807	168,989	169,702	200,382	343,109	3,255,341

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February, 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT		
5 - Engineering And Manufacturing Development		0604779F Jt Interoperability Tac Comd/Cntrl								2189		
	COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
2189 JINTACCS		4,662	1,919	6,389	6,293	6,412	6,559	6,756	6,958	Continuing	TBD	

(U) A. Mission Description and Budget Item Justification

- Description. JINTACCS Budget Activity, Engineering and Manufacturing Development effort, is designed to improve the interoperability of Tactical Command and Control (C2) Systems used in support of joint operations. JINTACCS supports Air Force participation with the Army, Navy and Marines, and the Joint Interoperability and Engineering Organization (JIEO) which acts as the Executive Agent. Service and agency activities are governed by Joint Chiefs of Staff (JCS) approved documentation including Technical Interface Concepts and Technical Interface Design Plans. Close liaison across each of the Service JINTACCS programs precludes duplication of efforts. Elements of the Tactical Air Control System, E-3 Airborne Warning and Control System (AWACS) and Joint Tactical Information Distribution System (JTIDS) participate in this program. The JINTACCS program, formerly Ground and Amphibious Military Operation (GAMO), is directed by JCS Memorandum 205-72, dated 1 April 1971, as modified by a Secretary of Defense memorandum, "Reorganization of the DoD Program to Achieve Interoperability of Tactical C2 Systems for GAMO," dated 2 Aug 1977. The program complies with requirements of DoD Directive 4630.5, "Compatibility, Interoperability, and Integration of Command, Control, Communications, and Intelligence (C3I) Systems," November 12, 1992, and DoD Instruction 4630.8, "Procedures for Compatibility, Interoperability, and Integration of C3I Systems," November 18, 1992.

- Justification.

-- The JINTACCS program entails the compatibility and interoperability of C3 systems including tactical intelligence for joint or combined operations through the development and management of a joint architecture, requirements process, interface definitions, message text formats (MTFs), Tactical Digital Information Links (TADILs), and other combat data link standards. This includes the coordination of all combat data link and MTF testing certification and configuration management of standards efforts under one program element. This project supports the efforts to ensure C3 systems' interoperability among all the CINCs, DoD agencies, and the services.

-- Development/certification testing is a pre-production requirement IAW DoDD 4630.5 and DoDI 4630.8.

-- Program Element is not broken out into projects; program element activities are described on page 6 of this report.

(U) FY 1994

- (U) Began Air Force testing of the TADIL-J message standard. (\$200)
- (U) Began acquisition of Iceland Air Defense System (IADS) test equipment. (\$600)
- (U) Began Combat Air Forces (CAF) preliminary testing of TADIL-J in ABCCC and AWACS. (\$43)
- (U) Began review of impact of emerging DoD data element standardization on United States MTF (USMTF) standard. (\$150)
- (U) Began feasibility analysis of ADA 9X for use in object-oriented prototype development. (\$150)
- (U) Began acquisition of JTIDS Test Device (JTD). (\$500)
- (U) Began CAF testing of JTIDS Modular Air Operations Center Integration (JMI). (\$250)
- (U) Began technology exchange/integration with Joint Staff J6 Global Command and Control System (GCCS) project. (\$100)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE
BUDGET ACTIVITY	PE NUMBER AND TITLE	
5 - Engineering And Manufacturing Development	0604779F Jt Interoperability Tac Comd/Cntrl	February, 1995
- (U) Continued development of automated test analysis system. (\$367)		
- (U) Continued modification of message standards supporting Theater Missile Defense (TMD). (\$200)		
- (U) Continued development of Digital Message Transfer Device (DMTD) and Variable Message Format (VMF) standards. (\$363)		
- (U) Continued development of TADIL-J capability. (\$200)		
- (U) Continued network design and aids development for JTIDS network design facility and architecture. (\$420)		
- (U) Continued advanced MTF processing development. (\$300)		
- (U) Continued expansion of MTF certification testing to fielded systems. (\$300)		
- (U) Continued integration of MCE Operational Facilities (OPFAC) into test facilities. (\$319)		
- (U) Completed technology exchange/integration with Joint Staff J6 Joint Universal Data Interpreter (JUDD) project. (\$150)		
- (U) Completed CAF testing of JTIDS Modular Air Operations Center Integration (JMI).		
- (U) Completed integration of ABCCC OPFAC into test facility. (\$50)		
(U) FY 1995		
- (U) Begin Joint testing of JMI. (\$200)		
- (U) Begin exercise participation of expanded USMTF processing Proof-of-Concept. (\$50)		
- (U) Begin Theater Battle Management (TBM) C4I architecture development/data model development. (\$25)		
- (U) Continue technology exchange/integration with Joint Staff GCCS project. (\$190)		
- (U) Continue Air Force testing of the TADIL-J message standard. (\$70)		
- (U) Continue CAF preliminary testing of TADIL-J in ABCCC and E-3. (\$100)		
- (U) Continue review of impact of emerging DoD data element standardization on USMTF standard. (\$50)		
- (U) Continue feasibility analysis of ADA 9X for use in object-oriented prototype development. (\$50)		
- (U) Continue acquisition of JTD/enhancements. (\$416)		
- (U) Continue development of automated test analysis system. (\$100)		
- (U) Continue modification of message standards supporting TMD. (\$50)		
- (U) Continue development of DMTD and VMF standards. (\$50)		
- (U) Continue development of TADIL-J capability. (\$25)		
- (U) Continue network design and aids development for JTIDS network design facility and architecture. (\$60)		
- (U) Continue advanced MTF processing development. (\$100)		
- (U) Continue expansion of MTF certification testing to fielded systems. (\$43)		
- (U) Continue integration of MCE OPFAC into test facilities. (\$100)		
- (U) Complete acquisition of IADS test equipment. (\$240)		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE	
5 - Engineering And Manufacturing Development		0604779F Jt Interoperability Tac Comd/Cntrl	February, 1995 2189
(U) FY 1996			
<ul style="list-style-type: none"> - (U) Begin CAF testing of MCE P3L. (\$175) - (U) Begin CAF testing of IADS. (\$150) - (U) Begin acquisition of JSTARS test equipment. (\$300) - (U) Begin integration of JSTARS OPFAC into test facility. (\$200) - (U) Begin development/evaluation of follow-on USMTF replacement. (\$600) - (U) Begin development of interactive USMTF tool. (\$500) - (U) Continue exercise participation for expanded USMTF processing Proof-of-Concept. (\$164) - (U) Continue TBM C4I architecture development/data model development. (\$200) - (U) Continue technology exchange/integration with Joint Staff GCCS project. (\$200) - (U) Continue CAF preliminary testing of TADIL-J in ABCCC and E-3. (\$100) - (U) Continue review of impact of emerging DoD data element standardization on USMTF standard. (\$200) - (U) Continue feasibility analysis of ADA 9X for use in object-oriented prototype development. (\$300) - (U) Continue acquisition of JTD/enhancements. (\$500) - (U) Continue development of automated test analysis system. (\$400) - (U) Continue modification of message standards supporting TMD. (\$300) - (U) Continue development of DMTD and VMF standards. (\$200) - (U) Continue development of TADIL-J capability. (\$300) - (U) Continue network design and aids development for JTIDS network design facility and architecture. (\$500) - (U) Continue advanced MTF processing development. (\$600) - (U) Continue expansion of MTF certification testing to fielded systems. (\$300) - (U) Complete integration of MCE OPFAC into test facilities. (\$200) 			
(U) FY 1997			
<ul style="list-style-type: none"> - (U) Begin CAF testing of JSTARS. (\$200) - (U) Begin Joint testing of IADS. (\$168) - (U) Continue CAF testing of MCE P3L. (\$150) - (U) Continue development/evaluation of follow-on USMTF replacement. (\$600) - (U) Continue development of interactive USMTF tool. (\$500) - (U) Continue exercise participation for expanded USMTF processing Proof-of-Concept. (\$150) - (U) Continue TBM C4I architecture development/data model development. (\$200) - (U) Continue technology exchange/integration with Joint Staff GCCS project. (\$200) - (U) Continue CAF preliminary testing of TADIL-J in ABCCC and E-3. (\$100) - (U) Continue review of impact of emerging DoD data element standardization on USMTF standard. (\$200) 			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE
February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

5 - Engineering And Manufacturing Development

0604779F Jt Interoperability Tac Comd/Cntrl

- (U) Continue feasibility analysis of ADA 9X for use in object-oriented prototype development. (\$300)
- (U) Continue acquisition of JTD/enhancements. (\$500)
- (U) Continue development of automated test analysis system. (\$400)
- (U) Continue modification of message standards supporting TMD. (\$300)
- (U) Continue development of DMTD and VMF standards. (\$200)
- (U) Continue development of TADIL-J capability. (\$200)
- (U) Continue network design and aids development for JTIDS network design facility and architecture. (\$500)
- (U) Continue advanced MTF processing development. (\$600)
- (U) Continue expansion of MTF certification testing to fielded systems. (\$300)
- (U) Complete acquisition of JSTARS test equipment. (\$300)
- (U) Complete integration of JSTARS OPFAC into test facility. (\$225)

(U) B. Program Change Summary (\$ in Thousands)

	FY 1994	FY 1995	FY 1996	FY 1997	Total Cost TBD
(U) Previous President's Budget	4,793	2,063	6,389	6,293	
(U) Appropriated Value	4,793	2,063			
(U) Adjustments to Appropriated Value					
a. General Congressional Reduction	-64	-107			
b. Below Threshold reprogramming	-13				
c. Small Business Innovative Research	-54	-37			
(U) Adjustments to Budget Years Since FY95 PB			-33	-32	
(U) Current Budget Submit/President's Budget	4,662	1,919	6,356	6,261	TBD

(U) Change Summary Explanation:

Funding: None

Schedule: None

Technical: None

(U) C. Other Program Funding Summary (\$ in Thousands) NOT APPLICABLE

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE _____

February, 1995

BUDGET ACTIVITY

5 - Engineering And Manufacturing Development

(U) D. Schedule Profile

PE NUMBER AND TITLE

0604779F Jt Interoperability Tac Comd/Cntrl

[illegible]

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

5 - Engineering And Manufacturing Development

0604779F Jt Interoperability Tac Comd/Cntrl

2189

(U) A. Project Cost Breakdown (\$ in Thousands)

	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>
(U) Certification Testing Support Equipment Acquisition	1,100	800	800	800
(U) System engineering	2,669	499	4,214	3,925
(U) Certification Testing & Evaluation	493	400	725	918
(U) Joint Service TADIL/MTF Configuration Management	250	100	500	500
(U) Travel	150	120	150	150
(U) Total	4,662	1,919	6,389	6,293

(U) B. Budget Acquisition History and Planning Information (\$ in Thousands) NOT APPLICABLE

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE									
#5 Engineering Manufacturing and Development		0604851F ICBM Modernization EMD									
COST (\$ in Thousands)	FY 1994 Actual*	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Total Program Element (PE) Cost	125,412	140,153	192,719	162,213	78,690	71,189	33,594	0	0	1,094,548	
133B Rapid Execution and Combat Targeting	26,001	21,792	4,092	0	0	0	0	0	0	293,100	
3085 Guidance Replacement Program	84,495	92,525	120,755	70,113	0	0	0	0	0	417,251	
4210 Propulsion Replacement Program	14,916	25,836	67,872	92,100	78,690	71,189	33,594	0	0	384,197	
* FY94 funding was under PE 101213F (Minuteman Squadrons)											
A. (U) <u>Mission Description and Budget Item Justification</u>											
<p>(U) Ongoing directed efforts emphasize extending the operational life of the Minuteman III ICBM weapon system and are in response to DoD direction to the Air Force to expand its effort to extend the life of the Minuteman III. The Rapid Execution and Combat Targeting Program (REACT) replaces unsupportable (1960's) Minuteman launch control center equipment and provides state-of-the-art command, control, and communication systems. The Guidance Replacement Program (GRP) will replace the Minuteman III (NS-20) guidance set electronics. The Propulsion Replacement Program (PRP) will remanufacture solid fuel stages to correct age-related degradations and maintain existing weapon system reliability. These efforts were defined and validated in DoD's Minuteman III Life Extension Report to Congress, dated 29 Jul 92. These programs are in Budget Activity/Research Activity Engineering Manufacturing and Development.</p>											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE		
#5 Engineering Manufacturing and Development	0604851F ICBM Modernization EMD		
B. (U) <u>Program Change Summary (\$ in Thousands)</u>			
		1994	1995
Previous President's Budget		130,360	151,675
Appropriated Value		131,090	138,048*
Adjustments to Appropriated Value			
Congressional Reductions		-3,174	-1,515
LRP moved to PE 0603851 ICBM Dem/Val		-2,504	
SBIR			-2,881
Below Threshold Reprogramming			6,501
Adjustments to Budget Years Since FY95 PB			
Current Budget Submit/President's Budget		125,412	140,153
			19,310
			192,719
			54,536
			162,213
			1,094,548
*Appropriations Committee reduced PE 0101213F \$10M without prejudice to any program and moved LRP to new ICBM Dem/Val PE. Committee language also moved PRP, GRP, and REACT from PE 0101213 to PE 0604851.			
Change Summary Explanation:			
(U) Funding: Propulsion Replacement Program funding adjusted to service cost position. Long Range Planning funding moved from PE 0101213 to PE 0603851.			
(U) Schedule: N/A			
(U) Technical: N/A			
C. (U) <u>Other Program Funding Summary (\$ in Thousands)</u>			
		1994	1995
APPN #14 (Missile Procurement - AF),		19,763	0
Cost Cat 21000 (Missile Modifications),			16,700
PE 11213F (Minuteman Squadrons), BA-03 (Weapons Procurement), WSC M30MLG			107,500
			302,320
			322,520
			450,950
			2,122,800
			4,102,740
D. (U) <u>Schedule Profile</u> See individual projects			

Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#5 Engineering and Manufacturing Development		0604851F ICBM Modernization EMD								133B	
COST (\$ in Thousands)		FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Rapid Execution and Combat Targeting		26,001	21,792	4,092	0	0	0	0	0	0	293,100
<p>A. (U) <u>Mission Description and Budget Item Justification (\$ In Thousands)</u></p> <p>Minuteman launch control centers (LCCs) have been deployed since the early 1960's. Since the original deployment, numerous communications and weapon system modifications have been installed on a stand-alone basis without consideration for human engineering interfaces and space limitations of the LCC. Additional communications requirements and changes in crew procedures have, over time, resulted in task saturation of the crew members. Air Force Materiel Command (AFMC) studies show that the Weapon System Control Element (WSCE) is reaching the end of its useful life. Manufacturers no longer produce many of the replacement parts and computer memory capacity has reached its limits. The Rapid Execution and Combat Targeting (REACT) program was initiated in 1988 to address these concerns. The program combines five related efforts to improve maintainability, supportability, reliability, responsiveness and operability of the weapon system: Weapon System Controller (WSC) hardware replacement, Rapid Message Processing (RMP), rapid retargeting software, launch control center console integration, and Missile Procedures Trainer (MPT) computer replacement. The program will modify LCCs and associated trainers. The new WSCE provides significantly increased system capacity and eliminates supportability difficulties of the current WSC. REACT will be integrated into both currently deployed versions of the Minuteman LCC (AM & B weapon systems). The Rapid Message Processing element and rapid retargeting will streamline current procedures and provide greater flexibility for crew members responding to critical National Command Authority directives. The MPT modification will reflect current operational configurations and ensure crew members receive maximum benefit from training time. This project sustains a fielded operational weapon system.</p> <p>(U) <u>FY 1994</u></p> <ul style="list-style-type: none"> - (U) WSCE hardware and software development. (\$18,097) - (U) REACT Communications Element development. (\$4,329) - (U) Nuclear Safety Cross Check Analysis (NSCCA) of operational software. (\$2,538) - (U) WSCE software functional configuration audit (FCA)/physical configuration audit (PCA)(AM), complete formal AM weapon system testing. (\$1,037) 											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY				PE NUMBER AND TITLE						PROJECT NO.			
#5 Engineering and Manufacturing Development				0604851F ICBM Modernization EMD						133B			
COST (\$ in Thousands)		FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost		
Rapid Execution and Combat Targeting		26,001	21,792	4,092	0	0	0	0	0	0	293,100		
<p>(U) <u>FY 1995</u></p> <ul style="list-style-type: none"> - (U) Continue WSCE hardware and software development (B system). (\$12,266) - (U) Continue REACT Communications Element development (B system). (\$2,889) - (U) Continue NSCCA of operational software. (\$2,527) - (U) Complete depot activation, obtain First Asset Delivery (FAD) of AM weapon system. - (U) Complete AM weapon system deployment, conduct B system software FCA/PCA, begin B weapon system Initial Operational Test and Evaluation (IOT&E). Complete formal B weapon system test, obtain nuclear certification of B weapon system software. (\$4,110) <p>(U) <u>FY 1996</u></p> <ul style="list-style-type: none"> - (U) Obtain FAD of B system, complete B system deployment, achieve Last Asset Delivery (LAD). (\$2,492) - (U) Develop modifications to Missile Maintenance Trainer. (\$1,600) <p>(U) <u>FY 1997</u></p> <ul style="list-style-type: none"> - (U) Not Applicable (Program complete) 													

BUDGET ACTIVITY						PE NUMBER AND TITLE		DATE		PROJECT NO.	
#5 Engineering and Manufacturing Development						0604851F ICBM Modernization EMD		February 1995		133B	
<u>B. (U) Program Change Summary (\$ in Thousands)</u>											
Previous President's Budget	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>Total Cost</u>				
Appropriated Value	26,001	21,792	4,092	0			293,100				
Adjustments to Appropriated Value	26,147	21,792									
Congressional Reductions	-146										
Adjustments to Budget Years Since FY95 PB											
Current Budget Submit/President's Budget	26,001	21,792	4,092	0			293,100				
Change Summary Explanation: Not applicable											
(U) Funding:	N/A										
(U) Schedule:	N/A										
(U) Technical:	N/A										
<u>C. (U) Other Program Funding Summary (\$ in Thousands)</u>											
APPN #14 (Missile Procurement - AF), Cost Cat 21000 (Missile Modifications), PE 11213F (Minuteman Squadrons), BA-03 (Weapons Procurement), WSC M30MLG	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>To Compl</u>	<u>Total Cost</u>			
	19,763	0	16,700	0	0	0	0	358,400			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995																																																																																																																							
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.		133B																																																																																																																						
#5 Engineering and Manufacturing Development	0604851F ICBM Modernization EMD																																																																																																																									
D. (U) <u>Schedule Profile</u>																																																																																																																										
		<table border="0"> <tr> <td></td> <td colspan="3"><u>1994</u></td> <td colspan="3"><u>1995</u></td> <td colspan="3"><u>1996</u></td> <td colspan="3"><u>1997</u></td> </tr> <tr> <td></td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>First Asset Delivery (AM System)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>First Asset Delivery (B System)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Last Asset Delivery (B System)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>DT&E (AM System)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>IOT&E (AM System)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>DT&E (B System)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>IOT&E (B System)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>					<u>1994</u>			<u>1995</u>			<u>1996</u>			<u>1997</u>				1	2	3	4	1	2	3	4	1	2	3	4	First Asset Delivery (AM System)													First Asset Delivery (B System)													Last Asset Delivery (B System)													DT&E (AM System)													IOT&E (AM System)													DT&E (B System)													IOT&E (B System)												
	<u>1994</u>			<u>1995</u>			<u>1996</u>			<u>1997</u>																																																																																																																
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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#5 Engineering and Manufacturing Development		0604851F ICBM Modernization EMD								133B	
A. (U) <u>Project Cost Breakdown (\$ in Thousands)</u>		<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>						
AM Weapon System Development		22,426									
B Weapon System Development			15,155								0
NSCCA		2,538	2,527								
AM System Configuration Audits & Test		1,037									
B Systems Test			4,110								0
Complete AM & B Deployment				2,492							
Total		26,001	21,792	1,600							0
B. (U) <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u>											
Performing Organizations:											
Contractor or	Method/Type	Award or	Performing	Project	Total						
Government	or Funding	Obligation	Activity	Office	Prior to						
Performing	Vehicle	Date	EAC	EAC	1994	Budget	Budget	Budget	Budget	Budget to	Total
Activity						1994	1995	1996	1997	Complete	Program
<u>Product Development Organizations</u>											
Loral	FPIAF/CPAF	4 Apr 89	160,200	159,200	241,212	26,001	21,792	4,092	0	0	293,100
<u>Support and Management Organizations</u>											
<u>Test and Evaluation Organizations</u>											
<u>Government Furnished Property</u> Not applicable											
Total Project			160,200	159,200	241,212	26,001	21,792	4,092	0	0	293,100

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Maj Avance/SAF/AQQS(M)/7-8123/21-Mar-95

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#5 Engineering and Manufacturing Development		0604851F ICBM Modernization EMD								3085	
COST (\$ In Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Guidance Replacement Program	84,495	92,525	120,755	70,113	0	0	0	0	0	417,251	
<p>A. (U) <u>Mission Description and Budget Item Justification (\$ in Thousands)</u></p> <p>The Minuteman III will become the only land-based ICBM in the TRIAD when Peacekeeper is retired. Ongoing Minuteman life extension efforts are required to extend the life of the Minuteman III. The Joint Requirements Oversight Council validated the Mission Need Statement for a Future Guidance System for Intercontinental Ballistic Missiles (ICBM) on 5 November, 1992. GRP replaces failing guidance system electronics and preserves the option to configure the missiles with the Peacekeeper Mk 21 reentry vehicle. The guidance electronics must be replaced since they continue to exhibit age-related degradation and are projected to become unreliable as early as 1997 and unsupportable as early as 1998. The Engineering and Manufacturing Development (EMD) contract was awarded to Rockwell International in August 1993. GRP includes the EMD, production, and installation of replacement guidance components to extend the life of the operational Minuteman III ICBM. Funding reflected here is for EMD.</p> <p>(U) <u>FY 1994</u></p> <ul style="list-style-type: none"> - (U) Hardware/software development. (\$60,125) - (U) Nuclear Surety Cross Check Analysis (NSCCA) and Independent Validation and Verification (IV&V). (\$2,346) - (U) ICBM codes development. (\$424) - (U) Systems engineering and technical support. (\$9,500) - (U) Other engineering support. (\$12,100) 											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#5 Engineering and Manufacturing Development		0604851F ICBM Modernization EMD								3085	
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Guidance Replacement Program	84,495	92,525	120,755	70,113	0	0	0	0	0	0	417,251
(U) <u>EY 1995</u>											
- (U) Hardware/software development. (\$74,640)											
- (U) NSCCA and IV&V. (\$5,268)											
- (U) ICBM codes development. (\$2,620)											
- (U) Systems engineering and technical support. (\$6,270)											
- (U) Other engineering support. (\$3,727)											
(U) <u>EY 1996</u>											
- (U) Hardware/software development. (\$90,585)											
- (U) NSCCA and IV&V. (\$4,500)											
- (U) ICBM codes development. (\$2,300)											
- (U) Systems engineering and technical support. (\$8,100)											
- (U) Labs and support agencies. (\$2,570)											
- (U) Testing. (\$12,700)											
(U) <u>EY 1997</u>											
- (U) Hardware/software development. (\$57,493)											
- (U) NSCCA and IV&V. (\$1,500)											
- (U) ICBM codes development. (\$1,500)											
- (U) Systems engineering and technical support. (\$5,000)											
- (U) Labs and support agencies. (\$2,520)											
- (U) Testing. (\$2,100)											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)			DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE		PROJECT NO.
#5 Engineering and Manufacturing Development		0604851F ICBM Modernization EMD		3085
B. (U) <u>Program Change Summary (\$ in Thousands)</u>				
Previous President's Budget	1994	1995	1996	1997
Appropriated Value	87,669	100,383	102,016	52,621
Adjustments to Appropriated Value	87,425	90,383		
Congressional Reductions	-2520	-1,478		
Reprogrammings	-410			
SBIR		-2,881		
Below Threshold Reprogramming		6,501		
Adjustments to Budget Years Since FY95 PB			18,739	17,492
Current Budget Submit/President's Budget	84,495	92,525	120,755	70,113
				417,251
Total Cost 391,320				
Change Summary Explanation:				
(U) Funding: FY96 and FY97 funds increased to reflect estimated cost of development.				
(U) Schedule: N/A				
(U) Technical: N/A				
C. (U) <u>Other Program Funding Summary (\$ in Thousands)</u>				
	1994	1995	1996	1997
APPN #14 (Missile Procurement - AF),	0	0	0	107,500
Cost Cat 21000 (Missile Modifications),	0	0	0	302,320
PE 11213F (Minuteman Squadrons), BA-03 (Weapons Procurement), WSC M30MLG	0	0	321,120	225,350
			310,150	6,700
			To Compl	Total Cost
				1,273,140

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995	
BUDGET ACTIVITY					PE NUMBER AND TITLE					PROJECT NO.			
#5 Engineering and Manufacturing Development					0604851F ICBM Modernization EMD					3085			
D. (U) <u>Schedule Profile</u>													
					1994		1995		1996		1997		
					1	2	3	4	1	2	3	4	
Program Milestones													
Milestone III AFSARC												X	
Engineering Milestones													
SDR					X*								
PDR							X						
CDR											X		
FCA												X	
PCA												X	
T&E Milestones													
Combined DT&E/IOT&E Start													
First Flight Test									X				
Contract Milestones											X		
NSCCA/IV&V Contract Award													
Low Rate Initial Production											X		

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#5 Engineering and Manufacturing Development	0604851F ICBM Modernization EMD	3085	
A. (U) <u>Project Cost Breakdown (\$ in Thousands)</u>		<u>1994</u>	<u>1995</u>
		<u>1996</u>	<u>1997</u>
Hardware/Software Development		60,125	57,493
ICBM Codes Contract		424	1,500
NSCCA Contract		2,346	1,500
Labs/Agencies		464	2,520
Charles S. Draper Lab (CSDL)		3,144	0
SETA		9,500	5,000
Other Engineering Support & Testing		<u>8,492</u>	<u>2,100</u>
Total		84,495	70,113

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE	February 1995
BUDGET ACTIVITY										PROJECT NO.	
#5 Engineering and Manufacturing Development										3085	
PE NUMBER AND TITLE										0604851F ICBM Modernization EMD	
B. (U) Budget Acquisition History and Planning Information (\$ in Thousands)											
Performing Organizations:											
Contractor or Government Performing Activity	Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
<u>Product Development Organizations:</u>											
Rockwell	CPAF	31 Aug 93		314,566	31,723	60,125	74,640	90,585	57,493		314,566
Codes Contract				6,844	0	424	2,620	2,300	1,500		6,844
<u>Support and Management Organizations:</u>											
NSCCA/IV&V	CPAF	31 Mar 94		13,614	0	2,346	5,268	4,500	1,500		13,614
SE/TA	CPAF	4 Jan 94		34,450	5,580	9,500	6,270	8,100	5,000		34,450
CSDL	FP	30 Jun 94		6,914	3,770	3,144	0	0	0		6,914
Other Engineering Support		31 Aug 93		33,548	8,290	8,492	1,966	12,700	2,100		33,548
<u>Test and Evaluation Organizations:</u>											
AGMC	PO			1,153	0	58	208	481	406		1,153
White Sands	PO			1,363	0	116	360	481	406		1,363
Lt1 Mnt/SMIC	PO			3,143	0	116	1,193	986	848		3,143
Maxwell	MIPR			174	0	174	0	0			174
Sandia	PO			1,482	0	0	0	622	860		1,482
Subtotal Product Development				321,410	31,723	60,549	77,260	92,885	58,993		321,410
Subtotal Support and Management				88,526	17,640	23,482	13,504	25,300	8,600		88,526
Subtotal Test and Evaluation				7,315	0	464	1,761	2,570	2,520		7,315
Government Furnished Property	Not applicable										
Total Project				417,251	49,363	84,495	92,525	120,755	70,113		417,251

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Maj Trent/SAF/AQQS(M)/7-8123/21-Mar-95

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#5 Engineering and Manufacturing Development		0604851F ICBM Modernization EMD								4210	
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Propulsion Replacement Program	14,916	25,836	67,872	92,100	78,690	71,189	33,594	0	0	384,197	
<p>A. (U) <u>Mission Description and Budget Item Justification (\$ in Thousands)</u></p> <p>(U) The Propulsion Replacement Program will remanufacture solid fuel stages to correct age-related degradations, maintain existing weapon system reliability, and support Minuteman III life extension. Any of the degradations (propellant cracking, case corrosion, liner deterioration, inhibitor deterioration, and liner debond) can cause catastrophic motor failure and, in turn, mission failure. RDT&E efforts will identify replacement materials that are no longer available or which have become environmentally unacceptable, reduce life cycle costs, and identify corrections to age-related degradations. This project incorporates only changes that can be demonstrated in an appropriate time frame to ensure the Minuteman III propulsion system continues to meet existing performance capabilities and remains viable and supportable. The project entered Phase 2 (Engineering Manufacturing and Development) in FY94.</p> <p>(U) <u>FY 1994</u></p> <ul style="list-style-type: none"> - (U) Conducted component reuse and materials replacement studies and begin stage design and development changes. (\$6,645) - (U) Integrated program activities such as system engineering and program management. (\$4,598) - (U) Began fabrication, tooling and waste disposal for change verification motors. (\$3,673) <p>(U) <u>FY 1995</u></p> <ul style="list-style-type: none"> - (U) Integrate program activities such as system engineering, program management, range support, AEDC testing, booster disassembly/assembly, booster transportation. (\$9,954) - (U) Continue fabrication, tooling and waste disposal for change verification motors. (\$7,988) - (U) Continue component reuse and materials replacement studies, continue stage design and development. (\$7,430) - (U) Test change verification motors. (\$464) 											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#5 Engineering and Manufacturing Development		0604851F ICBM Modernization EMD								4210	
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Propulsion Replacement Program	14,916	25,836	67,872	92,100	78,690	71,189	33,594	0	0	0	384,197
<p>(U) <u>FY 1996</u></p> <ul style="list-style-type: none"> - (U) Continue fabrication, tooling and waste disposal for change verification motors. (\$31,862) - (U) Integrate program activities such as system engineering, program management, range support, AEDC testing, booster disassembly/assembly, booster transportation. (\$22,266) - (U) Continue component reuse and materials replacement studies, continue stage design and development to include refurbishment. (\$12,075) - (U) Test change verification motors. (\$1,669) <p>(U) <u>FY 1997</u></p> <ul style="list-style-type: none"> - (U) Integrate program activities such as system engineering, program management, range support, AEDC testing, booster disassembly/assembly, booster transportation. (\$32,820) - (U) Continue component reuse and materials replacement studies, continue stage design and development to include refurbishment. (\$27,458) - (U) Continue fabrication, tooling and waste disposal for change verification motors. (\$23,717) - (U) Begin software modification. (\$7,181) - (U) Test change verification motors. (\$924) 											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#5 Engineering and Manufacturing Development	0604851F ICBM Modernization EMD	4210	
B. (U) <u>Program Change Summary (\$ in Thousands)</u>			
Previous President's Budget	1994	1995	1996
Appropriated Value	14,916	25,873	62,780
Adjustments to Appropriated Value	15,000	25,873	50,511
Congressional Reductions	-84	-37	
Adjustments to Budget Years Since FY95 PB			41,589
Current Budget Submit/President's Budget	14,916	25,836	92,100
			384,197
Total Cost 370,300			
Change Summary Explanation:			
Funding: FY96 and out-year funding adjusted to meet AFSARC approved Service Cost Position.			
Schedule: N/A			
Technical: N/A			
C. (U) <u>Other Program Funding Summary (\$ in Thousands)</u>			
	1994	1995	1996
APPN #14 (Missile Procurement - AF),	0	0	0
Cost Cat 21000 (Missile Modifications),			
PE 11213F (Minuteman Squadrons), BA-03 (Weapons Procurement), WSC M30MLG			
	1997	1998	1999
	0	0	1,400
			212,900
			140,800
			2,116,100
			2,471,200
			Total Cost

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995				
BUDGET ACTIVITY					PE NUMBER AND TITLE								PROJECT NO.			
#5 Engineering and Manufacturing Development					0604851F ICBM Modernization EMD								4210			
D. (U) <u>Schedule Profile</u>					1994		1995		1996		1997					
					1	2	3	4	1	2	3	4	1	2	3	4
Program Milestones																
Milestone I/II Review					X*											
Engineering Milestones																
Design Development Test					X*											
Stage PDR					X											
T&E Milestones																
Change Verification Test					X											
Contract Milestones																
EMD Contract Awards					X											
Software Contract Award					X											
DT&E/IOT&E																
LRIP																
Milestone III																
* Complete																

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	PROJECT NO.	
BUDGET ACTIVITY	PE NUMBER AND TITLE			
#5 Engineering and Manufacturing Development	0604851F ICBM Modernization EMD			4210
A. (U) <u>Project Cost Breakdown (\$ in Thousands)</u>				
		<u>1994</u>	<u>1995</u>	<u>1996</u>
Technology Insertion		14,916	17,592	51,586
Software		0	0	0
Other Program Cost		0	319	1,288
SE/TA		0	5,605	7,633
ECC		0	1,758	4,385
Risks		0	<u>562</u>	<u>2,980</u>
Total		14,916	25,836	67,872
				<u>1997</u>
				64,653
				6,839
				1,756
				9,208
				5,496
				<u>4,148</u>
				92,100

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)										DATE		February 1995	
BUDGET ACTIVITY					PE NUMBER AND TITLE					PROJECT NO.			
#5 Engineering and Manufacturing Development					0604851F ICBM Modernization EMD					4210			
B. (U) Budget Acquisition History and Planning Information (\$ in Thousands)													
Performing Organizations:													
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program		
Product Development Organizations													
Thiokol	SS CPAF	Aug 94	100,946	100,946		4,469	4,817	17,910	28,406	45,344	100,946		
Aerojet	SS CPAF	Jul 94	92,603	92,603		5,403	7,934	19,388	19,828	40,050	92,603		
CSD	SS CPAF	Jul 94	102,647	102,647		4,951	6,859	21,269	25,261	44,307	102,647		
Software	C CPAF	2Q97	#	22,870					7,181	15,689	22,870		
Support and Management Organizations													
TRW	SS CPAF	Oct 94	N/A	43,458			5,605	7,633	9,208	21,012	43,458		
Program Integration			N/A	5,934		93	200	768	913	3,960	5,934		
Test and Evaluation Organizations													
AEDC	PO	Periodic	N/A	7,360			421	904	1,303	4,732	7,360		
Range (VAFB)	PO	Nov 99	N/A	8,379						8,379	8,379		
Government Furnished Property Not applicable													
Subtotal Product Development						14,823	19,610	58,567	80,676	145,390	319,066		
Subtotal Support and Management						93	5,805	8,401	10,121	24,972	49,392		
Subtotal Test and Evaluation							421	904	1,303	13,111	15,739		
Total Project						14,916	25,836	67,872	92,100	183,473	384,197		
# Data not available until after contract award.													

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#6 - Management Support		65101F, RAND Project AIR FORCE								1110	
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
RAND, Project AIR FORCE	24,000	24,039	25,924	26,571	27,807	29,194	30,264	31,458	Cont	TBD	
<p>(U) A. <u>Mission Description and Budget Item Justification</u></p> <p>Program funds RAND Project AIR FORCE (PAF), the only Air Force Federally Funded Research and Development Center for Studies and Analyses. It provides for continuing analytical research across a broad spectrum of aerospace issues and concerns. The PAF research agenda is focused primarily on mid- to long-term problems; in addition, PAF provides quick response assistance for senior Air Force officials on high priority, near-term issues. Results and analytical findings directly impact senior management deliberations on major issues. The Air Force Advisory Group (AFAG), chaired by the Vice Chief of Staff, reviews, monitors, and approves PAF research efforts. Each project is initiated, processed, and approved IAW PAF Sponsoring Agreement that requires General Officer (or SES equivalent) sponsorship and involvement on a continuing basis. This program primarily focuses on studies and analyses, and is in the Research Category and Budget Activity for Management Support.</p> <p>(U) <u>FY 1994</u></p> <ul style="list-style-type: none"> - (U) Principal research efforts included studies on countering U.S. aerospace power, psychological impact of air power, unanticipated scenarios, air mobility requirements, bomber flexibility, future fighter technologies, non-lethal weapons, effective air campaigns, utility of space operations, lean logistics, enhancing depot responsiveness, and a new paradigm for Air Force acquisition. - (U) Direct assistance studies included Air Force roles and missions, civil/military airlift mix, support to Air Combat Command force effectiveness study, low altitude training and operations, Air Force modeling and simulation, support to Scientific Advisory Board Theater Missile Defense Summer Study, satellite communications, intelligence support and mission planning, B-1 audit, and FSX support. 											

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#6 - Management Support	65101F, RAND Project AIR FORCE	1110	
(U) A. <u>Mission Description and Budget Item Justification - (Cont)</u>			
(U) <u>FY 1994 - (Cont)</u>			
<p>- (U) PAF research continues to be organized in the following seven projects. These seven projects are aimed at ensuring the Air Force can project aerospace power across the entire spectrum of conflict in an era of declining budgets, personnel, and force structure. These projects are continuing efforts, and do not lend themselves to a specific schedule profile.</p>			
<p><u>FY 1994 Projects</u></p> <p>Strategy and Doctrine</p> <p>Force Structure</p> <p>Aero Systems Modernization</p> <p>Force Employment</p> <p>C3I/Space</p> <p>Logistics</p> <p><u>Acquisition</u></p> <p>Total</p>		<p><u>(\$ in Millions)</u></p> <p>3.2</p> <p>3.8</p> <p>3.8</p> <p>3.0</p> <p>3.7</p> <p>3.5</p> <p><u>3.0</u></p> <p>24.0</p>	

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#6 - Management Support	65101F, RAND Project AIR FORCE	1110	
(U) A. <u>Mission Description and Budget Item Justification - (Cont)</u>			
(U) <u>FY 1995</u>			
<ul style="list-style-type: none"> - (U) Research will continue on long-term projects initiated during FY 1994 and prior years. - (U) The FY 1995 program has been finalized. It includes research on asymmetric strategies, bomber operations, new fighter technologies, air warfare modeling and simulation, air mobility issues, space operations, lean logistics, and the new paradigm for Air Force acquisition. - (U) PAF research will continue to be organized in the following seven projects: 			
			(\$ in Millions)
<u>FY 1995 Projects</u>			
Strategy and Doctrine			3.2
Force Structure			2.6
Aero Systems Modernization			4.7
Force Employment			2.9
C4I/Space			3.3
Logistics			3.3
<u>Acquisition</u>			<u>4.0</u>
Total			24.0

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	PROJECT NO.
BUDGET ACTIVITY	PE NUMBER AND TITLE		
#6 - Management Support	65101F, RAND Project AIR FORCE	February 1995	1110
(U) A. <u>Mission Description and Budget Item Justification - (Cont)</u>			
(U) <u>FY 1996</u>			
<ul style="list-style-type: none"> - (U) Research will continue on long-term projects initiated during FY 1995 and prior years. - (U) New topics will evolve from the major issues established by the AFAG where PAF has developed special expertise and can continue to make unique contributions to the Air Force. - (U) PAF research will continue to be organized in the following seven projects: 			
		FY 1996 Projects	(\$ in Millions)
		Strategy and Doctrine	3.6
		Force Structure	3.9
		Aero Systems Modernization	3.9
		Force Employment	3.4
		C4I/Space	3.9
		Logistics	3.8
		<u>Acquisition</u>	<u>3.5</u>
		Total	26.0

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.
#6 - Management Support	65101F, RAND Project AIR FORCE	1110
(U)A. <u>Mission Description and Budget Item Justification - (Cont)</u>		
(U) <u>FY 1997</u>		
<ul style="list-style-type: none"> - (U) Research will continue on long-term projects initiated in FY 1996 and prior years. - (U) New topics will evolve from the major issues established by the AFAG where PAF has developed special expertise and can continue to make unique contributions to the Air Force. - (U) PAF research will continue to be organized in the following seven projects: 		
FY 1997 Projects Strategy and Doctrine Force Structure Aero Systems Modernization Force Employment C4I/Space Logistics <u>Acquisition</u> Total		(\$ in Millions) 3.6 4.0 4.0 3.6 4.0 3.8 <u>3.6</u> 26.6

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	PROJECT NO.
BUDGET ACTIVITY	PE NUMBER AND TITLE		
#6 - Management Support	65101F, RAND Project AIR FORCE		1110
(U) B. <u>Program Change Summary (\$ in Thousands)</u>			
		1994	1995
Previous President's Budget		26,748	28,039
Appropriated Value		26,748	27,039
Adjustments to Appropriated Value, Cong Gen Reductions		2,748	3,000
Adjustment to Budget Years Since FY95 PB (PBD 604)			-130
Current Budget Submit/President's Budget		24,000	24,039 ; 25,924
			26,704
			<u>Total Cost</u>
			TBD
Change Summary Explanation:			
Funding:	One million dollars reduced by Authorization/Appropriation Committee.		
Schedule:	Three million dollars reduced for FFRDC general reduction.		
Technical:	Not Applicable		
(U) C. <u>Other Program Funding Summary (\$ in Thousands)</u> Not Applicable			
(U) Related Activities:			
- (U) PAF efforts span functional and organizational boundaries. As a result, the research conducted relates to a wide spectrum of Air Force activities.			
- (U) The results are deposited with the Defense Technical Information Center for appropriate dissemination to other qualified recipients.			
- (U) To assure unnecessary duplication, each newly proposed research effort is reviewed by the Air Force Studies and Analysis Agency.			
- (U) There is no unnecessary duplication of effort within the Air Force or the Department of Defense.			
(U) D. <u>Schedule Profile</u> Not Applicable			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY										DATE	
PE NUMBER AND TITLE										PROJECT NO.	
#6, RDT&E Management Support										February 1995	
PE 0605306F, Ranch Hand II Epidemiology Study 2767											
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Total 0605306F Cost	3,686	3,156	3,139	9,709	10,082	4,769	4,912	5,058	Cont	Cont	
Project 2767, Ranch Hand II Epidemiology Study	3,686	3,156	3,139	9,709	10,082	4,769	4,912	5,058	Cont	Cont	

A. (U) Mission Description and Budget Item Justification: This RDT&E Management Support program was directed in 1980 by the Assistant to the President of the United States for Domestic Affairs and Policy upon the recommendation of the Interagency Working Group on the Possible Long-Term Effects of Phenoxo Herbicides and Contaminants. As a result of this Presidential direction, PE 0605306F was established to conduct a 20-year epidemiology investigation of approximately 1200 Air Force personnel who were involved with aerial spraying of herbicides in Vietnam from 1962 to 1971 (Operation Ranch Hand). The objective of this investigation is to determine whether long-term health effects exist and can be attributed to occupational exposure to phenoxo herbicides and their associated dioxins. Dioxin is an unwanted by-product from manufacturing Herbicide Orange.

This project involves a 20-year study that compares United States Air Force (USAF) Ranch Hand personnel to other USAF crew members and support personnel who were not exposed to herbicides while serving in Vietnam. Approximately 2,200 individuals (exposed personnel group plus control group) are participating in the study. Analyses of yearly mortality rates and the past and present health status of the study population were begun in 1982 with follow-up health examination schedules at the 3-, 5-, 10-, 15-, and 20-year time periods. The study includes examination of the possible occurrence of birth defects in children as determined from children's medical records and family medical histories.

(U) FY 1994:

- (U) Converted raw data to database format for computer analyses. (\$1,186K)
- (U) Conducted serum dioxin analysis and completed serum dioxin assays. (\$925K)
- (U) Completed analyses of serum dioxin half-life. (\$856K)
- (U) Completed annual mortality update. (\$719K)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.
#6, RDT&E Management Support	PE 0605306F, Ranch Hand II Epidemiology Study	2767

(U) FY 1995:

- (U) Complete Year-10 morbidity report. (\$669K)
- (U) Complete annual mortality update. (\$729K)
- (U) Conduct statistical analysis of data sets. (\$734K)
- (U) Complete archiving of baseline physical exams. (\$500K)
- (U) Conduct additional analyses and reports. (\$524K)

(U) FY 1996:

- (U) Issue Air Force Health Study contract. (\$1,230K)
- (U) Complete annual mortality update. (\$630K)
- (U) Complete archiving of 1985 physical exams. (\$580K)
- (U) Conduct Participant Data Base Management. (\$419K)
- (U) Conduct statistical analyses in support of journals and reports. (\$280K)

(U) FY 1997:

- (U) Initiate next cycle of physical examinations and questionnaires. (\$7,778K)
- (U) Conduct examination data base verification. (\$418K)
- (U) Archive the 1987 examination data and digitize the 1997 data as received. (\$677K)
- (U) Initiate serum dioxin assays. (\$178K)
- (U) Start analyses for mortality update and journal articles. (\$378K)
- (U) Conduct medical records coding. (\$280K)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	PROJECT NO.																																				
BUDGET ACTIVITY	PE NUMBER AND TITLE																																						
#6, RDT&E Management Support	PE 0605306F, Ranch Hand II Epidemiology Study	2767																																					
<p>B. (U) Program Change Summary (\$ in Thousands):</p> <table border="0"> <thead> <tr> <th></th> <th><u>FY 1994</u></th> <th><u>FY 1995</u></th> <th><u>FY 1996</u></th> <th><u>FY 1997</u></th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Previous President's Budget</td> <td>3,686</td> <td>3,160</td> <td>3,239</td> <td>9,842</td> <td><u>Cost</u></td> </tr> <tr> <td>Appropriated Value</td> <td>3,707</td> <td>3,160</td> <td></td> <td></td> <td>Cont</td> </tr> <tr> <td>Adjustments to Appropriated Value</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> a. Congressional General Reductions</td> <td>-21</td> <td>-4</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Current President's Budget</td> <td>3,686</td> <td>3,156</td> <td>3,139</td> <td>9,709</td> <td>Cont</td> </tr> </tbody> </table> <p>Change Summary Explanation: Funding: Not Applicable. Schedule: Not Applicable. Technical: Not Applicable.</p>					<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>	Total	Previous President's Budget	3,686	3,160	3,239	9,842	<u>Cost</u>	Appropriated Value	3,707	3,160			Cont	Adjustments to Appropriated Value						a. Congressional General Reductions	-21	-4				Current President's Budget	3,686	3,156	3,139	9,709	Cont
	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>	Total																																		
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Current President's Budget	3,686	3,156	3,139	9,709	Cont																																		
<p>C. (U) <u>Other Program Funding Summary</u>: Not Applicable.</p>																																							
<p>D. (U) <u>Schedule Profile</u>: Not Applicable.</p>																																							

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT		
6 - Management Support		0605712F Initial Operational Test & Eval								0191		
	COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
0191	Initial Operational Test and Evaluation	27,056	33,004	24,506	26,921	34,601	31,320	32,255	33,216	Continuing	TBD	

(1) \$400 of FY 94 funds were transferred to pay a must-pay FY 94 bill, paid in Dec 94. The actual FY 94 total is \$26,656.

(U) A. Mission Description and Budget Item Justification: This program funds IOT&E tests conducted to evaluate a system's operational effectiveness and suitability and to identify any operational deficiencies or need for modifications in support of the acquisition process. This PE funds Congressionally mandated IOT&E to support major weapon system acquisition decision (Milestone III). For major systems designated for use in combat, the law requires IOT&E be completed under realistic field conditions before proceeding beyond low rate initial production. As an essential element of IOT&E, this PE will fund major Operational Utility Evaluations (OUE), Early Operational Assessments (EOA) and Operational Assessments (OA) which support major milestones and decision points prior to Milestone III. IOT&E is an operational evaluation of a system's performance when the complete system is tested and evaluated against operational criteria by personnel with the same qualifications as those who will operate, maintain and support the system when deployed. In general, IOT&Es are performed on new systems in development, major modifications and other systems as directed. IOT&E programs are identified in five categories: aircraft/support; space; missile/munitions; computer, communication, command and control and information (C4I); and general. This PE funds the costs of the test (e.g., data reduction, range costs, etc.), not the development of test resources or the maintenance of test infrastructure.

(U) FY 1994

- (U) HQ AFOTEC conducted IOT&E on the following 137 programs. (\$27,056) (See note 1 above.)
- (U) Category: Aircraft/Support Loader 60K, Advanced Support Equipment (ASE), F-15C/E Tactical Electronic Warfare System (TEWS), Tactics Training Route Complex/Route Integration Instrumentation System (TTRC/RIIS), Bomber Airborne Instrumentation System (BAIS), C-17, F-22 Advanced Tactical Fighter, Follow-on Tactical Reconnaissance System (FOTRS), B-2, Advanced X-Ray System, B-1B Conventional Munitions Upgrade Pgm (CMUP), AFMSS Conventional Mission Plan and Preparation System (CMPPS), F-16 Block 50D, EF-111A System Improvement Program (SIP), Advanced Strategic and Tactical IR Expend (ASTE), CV-22 Osprey, Simulator For Elect Combat (SECT), Maintenance Skills Tutors (MST), F-15 Manned Destructive SEAD (MDS), KC-135 Expanded Refueling Capability (ERC), F/A-16 CAS/BAI Aircraft, Standard Flight Data Recorder (SFDR), Airborne Laser (ABL), Directed IR Countermeasures (DIRCM), On-board Electronic Warfare Simulation (OBEWS), F-15 WRM Fuel Upgrade, Advanced Missile Warning System, F-15 APG-63 radar, and Compass Call.
- (U) Category: Space Cheyenne Mountain Upgrade (CMU), CMU-Survivable Communications Integration System (SCIS), CMU-Granite Sentry, CMU-Alternate Processing and Correlation Center (APCC), ICBM-Rapid Execution and Combat Target (REACT), Dual Frequency MEECN RCVR/Portable, Navstar GPS Phase III, Consolidated Space Operations Center (CSOC), Milstar, Integrated Correlation and Display System (ICADS), CMU-Command Center Process and Display System-Replacement, Survivable Defense Satellite Program (DSP-I), HAVE STARE Radar, Dual Frequency MEECN RCVR/Minuteman (DFMR/MM), Brilliant Eyes (BE), Ballistic Missile Defense (BMD)/Global Protection Against Limited Strikes (GPALS), Global Missile Defense (GMD), SDI Command Control Element (C2E), DMSP Block VI, Early Warning Radar, Ground Base Electro-Optical Deep Space Surveillance (GEODSS), GPS BLOCK II Follow-on (GPS IIF),

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0605712F Initial Operational Test & Eval

0191

CMU-Space Defense Operations Center 4C (CMU-SPADOC 4C), Alert Locate and Report Missiles (ALARM), CMU-Stratcom CMD Center Process and Display (CMU-STRATCOM), ICBM Minuteman III Guidance Program Phase I (ICBM-MMIII GR), Ground NDS Terminal (GNT), Attach & Launch Early Report to Theater (ALERT), and Theater Missile Defense-Intercept Missile (TMD-INTERCEPT).

- (U) Category: Missile/Munitions QF-4, Sensor Fused Weapon (SFW), Joint Direct Attack Munitions (JDAM), Joint Standoff Weapon (JSOW), AOD-Joint Programmable Fuze (JPF), Improved Data Link (IDL), and AIM-9X Air-to-Air Missile (AIM-9X).
- (U) Category: Computer, Communication, Command and Control and Information System (C4 I) Tower Restoral Vehicle (TRV), JTIDS (JTIDS Class 2 terminal Multiservice), Joint STARS, E-3 Radar System Improvement Pgm (E-3 RSIP), Advanced Training System, ABO-Base Recovery Communication Sys, AMC C-2 Info Processing System II-IV, Modular TACC (CTAPPS), DMSP Small Tactical Terminal (STT), Combat Survival Evader Locator (CSEL), Region/Sector Operations Control Center (R/SOCC), AF Training/Education Automated Management System (AFTEAMS), Combat Intelligence System (CIS), Improvement of Selected Intelligence Data Handling (IDHS), Modular Control Equipment (MCE P3I), Global Transportation Network (GTN), Military Microwave Landing Sys-Avionics (MMLSA), Microwave Landing Sys-Fixed Base (MLS-Fixed Base), E4B Universal Modem (E-4B UM ATV), CSD-Warime Medical System (CSD-WARMED), Cloud Depiction and Forecast System II (CDFS II), Strategic War Planning System (SWPS), Combat ID/Cooperative Aircraft ID (CI/CAI), and Military Airspace Management System (MAMS).
- (U) Category: General CWD-Aircrew Eye/Respiratory Protection-SAC, LS-Universal Water Activated Release System (LS-UWARS), CCD Multispec Total Decoys (CCD-MS Decoy), LS-Active Noise Reduction (LS-ANR), Chemically Hardened Air Transportable Hospital (CHATH), ABO-Armored Multi-Role Vehicle (ABO-ARMRV), RRR-Mat Anchoring, AOD-Adverse Terrain Ammo Assembly (ATAAT/ATTV), CCD-Multispectral Smoke (CCD-MS Smoke), CCD-Multispectral Nets (CCD-MS Nets), CCD-Vertical Smoke and Obscurant (CCD-V Smoke), CCD-Laser Warning/Laser Defeat (LASER), CSD-Spinal Cord Injury Transport System (SCITS), LS-Advanced Technology Anti-G Suit (ATAGS), LS-Advanced Night Vision System (LS-ANVS), CCD-Runway Signature Characterization Disguise (CCD-RSCD), SAB-Electric Rapid Utility Repair Kits (SAB-ELECT RURK), SAB-Water Rapid Utility Repair Kits (SAB-WATER RURK), ABO-EOD/Medical Protective Shield (ABO-EOD SHIELD), ABO-Mobile Ordnance Disrupter System (ABO-MOBILE), CCD-SPEED TRAP, CCD-GROUND JAMMER, ABO-Contingency Airfield Lighting System (ABO-CALS), RRR-Deployable Pavement Repair System, (RRR PAVE REPAIR), SAB-POL Rapid Utility Repair Kit (SAB-POL RURK), ABO-Rapid Ordnance Removable System (ABO-RORS), ABO-Aircraft Expedient Dispersal Tech (ABO-AEDT), ABO-EHR Munitions Stores Bins/Containers (ABO-EHR BINS), AFF-Deployable Fire Protection System (AFF-FIRE PROTECTION), BISS Active Denial System (BISS-ADS), Environmental Control Unit Replacement (ECU REPLACE), Wind Correction Munitions Dispenser (WCMD), CSD-Transportable Blood Transshipment Center (CSD-TBTC), LS-Passenger Smoke and Fume Protection (LS-PSFP), CWD-Disposable Eye/Respiratory Protect (CWD-DERP), CWD-Ground Crew Ensemble (CWD-GCENS), CWD-Auto Mustard Agent Det (M8A1) (CWD-AMAD), CWD-Explosive Ordnance Disposal Ensemble (CWD-EOD), AFF-CRASH/FIRE, ABO-Anti-Penetration Tactical Shelters (ABO TAC), Semi-hardened Air Mobile Structures (AIRMOB STRUCT), CCD-Simulation (CCD-SIM), AGM-130 INTEGRATION, Helmet Mounted Cueing System (HMCS), LS-COMBAT ACE, CWD-Fire Fighter's Ensemble (CWD-FFENS), CWD-Individual Vapor Detector (CWD-IVD), and CWD-Biological Detector (CWD-BIO DET).

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

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BUDGET ACTIVITY

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6 - Management Support

0605712F Initial Operational Test & Eval

PROJECT

0191

(U) FY 1995

- (U) FY 95 IOT&E Planning Program: HQ AFOTEC will conduct IOT&E on the following 132 programs. The FY 95 list of programs may not be all inclusive due to changing program schedules and "pop-up" requirements. (\$33,004)

- (U) Category: Aircraft/Support F-15C/E Tactical Electronic Warfare System (TEWS), C-17, F-22 Advanced Tactical Fighter, Follow-on Tactical Reconnaissance System (FOTRS), B-2, B-1B Conventional Munitions Upgrade Program (CMUP), F-16 Block 50D, EF-111A System Improvement Program (SIP), Advanced Strategic and Tactical IR Expend (ASTE), CV-22 Osprey, Simulator For Elect Combat (SECT), F-15 Manned Destructive SEAD (MDS), KC-135R Expanded Refueling Capability (ERC), F/A-16 CAS/BAI Aircraft, Compass Call, Loader 60K, B-1B Conventional Munitions Upgrade Pgm Block D/E (B-1B CMUP BLK D/E), Directed IR Countermeasures (DIRCM), F-15 Wrm Fuel Upgrade, Advanced Missile Warning System (ADV MSL WARN SYS), and F-15 APG-63 Radar.

- (U) Category: Space Cheyenne Mountain Upgrade (CMU), CMU-Survivable Communications Integration System (SCIS), Command Center Process and Display System-Replacement/SAC (CCPDS-R/SAC), CMU-Granite Sentry, CMU-Alternate Processing and Correlation Center (APCC), CMU-Space Defense Operation Center 4-C (SPADOC 4C), ICBM-Rapid Execution and Combat Target (REACT), Navstar GPS Phase III, Milstar, Integrated Correlation and Display System (ICADS), Survivable Defense Satellite Program (DSP-1), HAVE STARE Radar, Ground NDS Terminal (GNT), Brilliant Eyes (BE), Ballistic Missile Defense (BMD)/Global Protection Against Limited Strikes (GPALS), Global Missile Defense (GMD), DMSP Block VI, Early Warning Radar, GND Base Electro-Optical Deep Space Survival (GEODSS), Airborne Laser Lab (ABL), Alert Locate and Report Missiles (ALARM), SDI Command Control Element (SDI C2E), ICBM Minuteman III Guidance Program Phase I (ICBM-MMIII GR), ICBM Minuteman III Propulsion Replacement Program (ICBM-MMIII PRP), Navstar GPS Block IIR (GPS IIR), GPS Block II Follow-on (GPS IIF), ICBM Minuteman III Guidance Program Phase II (ICMB-MMIII GRP II), RSA Network Control (RSA-NC), RSA Centralized Telemetry Processing Systems (RSA-CTPS), RSA Unified Tracking Antenna (RSA-UTA), Advanced Electro-optical System (AEOS), and Attach & Launch Early Report to Theater (ALERT).

- (U) Category: Missile/Munitions QF-4, Sensor Fused Weapon (SFW), Joint Direct Attack Munitions (JDAM), Joint Standoff Weapon (JSOW), AOD-Joint Programmable Fuze (JPF), AIM-9X Air-to-Air Missile (AIM-9X), Theater Missile Defense-Intercept Missile (TMD-INTERCEPT), and AMRAAM (AIM-120C) P3I Phase 3 (AMRAAM P3I PH3).

- (U) Category: Computer, Communication, Command and Control and Information System (C4I) JTIDS (JTIDS Class 2 terminal Multiservice), Joint STARS, E-3 Radar System Improvement Program (E-3 RSIP), AMC C-2 Info Processing System II-IV, Modular TACC (CTAPPS), DMSP Small Tactical Terminal (STT), Combat Survival Evader Locator (CSEL), Region/Sector Operations Control Center (R/SOCC), AF Training/Education Automated Management System (AFTEAMS), Combat Intelligence System (CIS), Improvement of Selected Intelligence Data Handling (IDHS), Modular Control Equipment (MCE P3I), Global Transportation Network (GTN), Military Microwave Landing Sys-Avionics (MMLSA), ABO-Base Recovery Communication System (ABO BRCS), Tower Restoral Vehicle (TRV), Advance Training System (ADV TNG SYS), E4B Universal Modem (E-4B UM ATV), CSD-Warime Medical System (CSD-WARMED), Cloud

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6 - Management Support	0605712F Initial Operational Test & Eval	0191	

Depiction and Forecast System II (CDFS II), Theater Missile Defense (TMD - C4I), Strategic War Planning System (SWPS), Combat ID/Cooperative Aircraft ID (CI/CAI), E4B Mod Miniature Receive Terminal (E4B MMRT), and Military Airspace Management System (MAMS).

- (U) Category: General CCD-Multispectral Decoys (CCD-MS Decoy), LS-Active Noise Reduction (LS-ANR), Chemically Hardened Air Transportable Hospital (CHATH), ABO-Armored Multi-Role Vehicle (ABO-ARMRV), RRR-Mat Anchoring, AOD-Adverse Terrain AMMO Assem (ATAAT/ATTV), CCD-Multispectral Nets (CCD-MS Nets), CCD-Vertical Smoke and Obscure (CCD-V Smoke), CCD-Laser Warning/Laser Defeat (Laser), CSD-Spinal Cord Injury Transport System (SCITS), LS-Advanced Technology Anti-G Suit (ATAGS), CWD-Disposable Eye/Respiratory Protect (DERP), AFF-Deployable Fire Protection System (AFF-Fire Protection), LS-Advanced Night Vision System (LS-ANVS), CCD-Runway Signature Characterization Disguise (CCD-RSCD), CSD-Transportable Blood Transshipment Center (CSD-TBTC), SAB-Electric Rapid Utility Repair Kits (RURK), SAB-Water RURK, ABO-EOD/Medical Protective Shield (ABO-EOD Shield), ABO-Mobile Ordnance Disrupter System (MODS), RRR-Deployable Pavement Repair System, ABO-Rapid Ordnance Removable System (ABO-RORS), BISS Active Denial System, Environmental Control Unit (ECU) Replacement, LS-Passenger Smoke and Fire Protection, ABO-Aircraft Expedient Dispersal Tech, ABO-EHR Munitions Stores Bins/Containers, CCD-Speed Trap, SAB-POL RURK, LS-Universal Water Activated Release System (LS-UWARS), CCD-Multispectral Smoke (CCD-MS-SMOKE), CCD-Ground Jammer, Wind Correction Munitions Dispenser (WCMD), LS-Light Weight Low Profile Backstyle Parachute (LS-LTWT PARACHUTE), CWD Ground Crew Ensemble (CWD-GCENS), CWD-Auto Mustard Agent Det (M8A1) (CWD-AMAD), CWD-Explosive Ordnance Disposal Ensemble (CWD-EOD), AFF-Crash/Fire, ABO-Anti-Penetration Tactical Shelters (ABO-TAC), Semi-Hardened Air Mobile Structures (AIRMOB STRUCT), CCD-Simulation (CCD-SIM), AGM-130 Integration, Helmet Mounted Cueing System (HMCS), LS-Combat Ace, CWD-Fire Fighter's Ensemble (CWD-FFENS), and CWD-Biological Detector (CWD-BIO DET). Milstar: Plan completion of Milestone II of Milstar Polar Adjunct. Test Execution of terminal IOT&E Phase II in 1995. SFW: IOT&E scheduled to begin Oct 1994 and continue until 30 Jun 1995. Testing will be held at Eglin AFB, FL. C-17: IOT&E will end Jan 95, with the accomplishment of Milestone IIIB in Jul 95.
- (U) FY 1996
- (U) FY 96 IOT&E Planning Program: HQ AFOTEC will conduct IOT&E on the following 107 programs. The FY 96 list of programs may not be all inclusive due to changing program schedules and "pop-up" requirements. (\$24,506)
- (U) Category: Aircraft/Support F-15C/E Tactical Electronic Warfare System (TEWS), C-17, Loader 60K, F-22 Advanced Tactical Fighter, Follow-on Tactical Reconnaissance System (FOTRS), B-2, B-1B Conventional Munitions Upgrade Program (CMUP), EF-111A System Improvement Program (SIP), Compass Call, CV-22 Osprey, F-15 APG-63 Radar, F-15 Manned Destructive SEAD (MDS), F-15 WRM Fuel Tanks, KC-135R Expanded Refueling Capability (ERC), F/A-16 CAS/BAI Aircraft, Advanced Missile Warning, Simulator for Electronic Combat (SECT), Advanced Strategic and Tactical IR Expend (ASTE), and B-1B Conventional Munitions Upgrade Pgm Block D/E (B-1B CNUP BLK D/E).
- (U) Category: Space Cheyenne Mountain Upgrade (CMU), CMU-Survivable Communications Integration System (SCIS), CMU-Granite Sentry, CMU-Alternate Processing and Correlation Center (APCC), Milstar, Integrated Correlation and Display System (ICADS), Survivable Defense Satellite Program (DSP-I), HAVE STARE Radar, Ground NDS Terminal (GNT), Alert Locate and Report Missiles (ALARM), Brilliant Eyes (BE), DMSP Block VI, Airborne Laser Lab

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

6 - Management Support

0605712F Initial Operational Test & Eval

PROJECT

0191

(ABL), Attack and Launch Early Reporting to Theater (ALERT), Ballistic Missile Defense (BMD) System, SDI Command Control Element (SDI C2E), Early Warning Radar (EWR), Ground Base Electro-Optical Deep Space Surveillance (GEODSS), ICBM Minuteman III Propulsion Replacement Program (ICBM-MMIII PRP), Navstar GPS Block IIR (GPS IIR), GPS Block II Follow-on (GPS IIF), ICBM Minuteman III Guidance Program Phase II (ICBM-MMIII GRP II), RSA Network Control (RSA-NC), RSA Centralized Telemetry Processing Systems (RSA-CTPS), RSA Unified Tracking Antenna (RSA-UTA), Advanced Electro-Optical System (AEOS) and ICBM-Rapid Execution and Combat Target (REACT).

- (U) Category: Missile/Munitions Joint Direct Attack Munitions (JDAM), Joint Standoff Weapon (JSOW), AOD-Joint Programmable Fuze (JPF), AIM-9X Air-to-Air Missile (AIM-9X), Theater Missile Defense-Intercept Missile (TMD-Intercept), and AMRAAM (AIM-120C) P31 Phase 3 (AMRAAM P31 PH3).
- (U) Category: Computer, Communication, Command and Control and Information System (C4I) Joint STARS, AMC C-2 Info Processing System II-IV, Combat Survival Evader Locator (CSEL), CWD-Warime Medical System (CWD-WARMED), Region/Sector Operations Control Center (R/SOCC), Modular Control Equipment (MCE P31), Military Airspace Management System (MAMS), Global Transportation Network (GTN), Military Microwave Landing System (MMLSA), Tower Restoral Vehicle (TRV), DMSP Small Tactical Terminal (DMSP-STT), Advance Training System (ADV TNG SYS), Improvement of Selected Intelligence Data Handling (IDHS), E3 Radar System Improvement Program (E3 RSIP), JTIDS Class 2 Terminal Multiservice (JTIDS CL2), E4B Universal Modem (E4B UM ATV), Combat Intelligence System (CIS), Modular TACC (CTAPS), Cloud Depiction and Forecast System II (CDFS II), Theater Missile Defense - C4I (TMD-C4I), Combat ID/Cooperative Aircraft ID (CI/CAI), and E4B Mod Miniature Receive Terminal (E4B MMRT).
- (U) Category: General Chemically Hardened Air Transportable Hospital (CHATH), ABO-Armored Multi-Role Vehicle (ABO-ARMR V), ABO-Anti-Penetration Tactical Shelters (ABO-TAC), AFF Crash/Fire, RRR-Mat Anchoring, CCD-Multispectral Nets (CCD-MS Nets), CCD-Simulation, CCD-Vertical Smoke and Obscurant (CCD-V Smoke), CCD-Laser Warning/Laser Defeat (Laser), CSD-Spinal Cord Injury Transport System (SCITS), CWD-Biological Detector (CWD-BIO DET), CWD-Disposable Eye/Respiratory Protect (DERP), CWD-Fire Fighter's Ensemble (CWD-FFENS), LS-Advanced Night Vision System (LS-ANVS), LS-Combat ACE, CCD-Runway Signature Characterization Disguise (CCD-RSCD), CSD-Transportable Blood Transshipment Center (CSD-TBTC), HMCS, SAB-Electric Rapid Utility Repair Kits (RURK), SAB-Water RURK, ABO-EOD/Medical Protective Shield (ABO-EOD Shield), ABO-Mobile Ordnance Disrupter System (MODS), RRR-Deployable Pavement Repair System, ABO-Rapid Ordnance Removable System (ABO-RORS), BISS Active Denial System, Environmental Control Unit (ECU) Replacement, ABO-Aircraft Expedient Dispersal Tech, ABO-EHR Munitions Stores Bins/Containers, CCD-Speed Trap, Semi-hardened Air Mobile Structures (Airmob Struct), SAB-POL RURK, CCD-Ground Jammer, and AGM-130 Integration.

(U) FY 1997

- (U) FY 97 IOT&E Planning Program: HQ AFOTEC will conduct IOT&E on the following 93 programs. The FY 97 list of programs may not be all inclusive due to changing program schedules and "pop-up" requirements. (\$26,921)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT
0191

6 - Management Support

0605712F Initial Operational Test & Eval

- (U) Category: Aircraft/Support F-22 Advanced Tactical Fighter, Follow-on Tactical Reconnaissance System (FOTRS), B-2, B-1B Conventional Munitions Upgrade Program (CMUP), EF-111A System Improvement Program (SIP), Compass Call, CV-22 Osprey, F-15 APG-63 Radar, F-15 Manned Destructive SEAD (MDS), KC-135R Expanded Refueling Capability (ERFC), F/A-16 CAS/BAI Aircraft, Advanced Missile Warning, Loader 60K, Advanced Strategic and Tactical IR Expend (ASTE), and B1B Conventional Munitions Upgrade Pgm Block D/E (B1B CMUP BLK D/E).
- (U) Category: Space Cheyenne Mountain Upgrade (CMU), Milstar, Integrated Correlation and Display System (ICADS), Survivable Defense Satellite Program (DSP-1), Ground NDS Terminal (GNT), Alert Locate and Report Missiles (ALARM), Brilliant Eyes (BE), DMSP Block VI, Airborne Laser Lab (ABL), CMU-GRANITE SENTRY, CMU-Alternate Processing and Correlation Center (CMU-APCC), Ballistic Missile Defense (BMD) System, SDI Command Control Element (SDI C2E), HAVE STARE Radar, Early Warning Radar (EWR), Ground Based Electro-Optical Deep Space Surveillance (GEODSS), ICBM Minuteman III Propulsion Replacement Program (ICBM-MMIII PRP), Navstar GPS Block IIR (GPS IIR), GPS Block II Follow-on (GPS IIF), ICBM Minuteman III Guidance Program Phase II (ICBM-MMIII GRP II), RSA Network Control (RSA-NC), RSA Centralized Telemetry Processing Systems (RSA-CTPS), RSA Unified Tracking Antenna (RSA-UTA), Advanced Electro-Optical System (AEOS), and Attach & Launch Early Report to Theater (ALERT).
- (U) Category: Missile/Munitions Joint Direct Attack Munitions (JDAM), Joint Standoff Weapon (JSOW), AOD-Joint Programmable Fuze (JPF), AIM-9X Air-to-Air Missile (AIM-9X), Theater Missile Defense-Intercept Missile (TMD-Intercept), and AMR-AAM (AIM-120C) P31 Phase 3 (AMRAAM P31 PH3).
- (U) Category: Computer, Communication, Command and Control and Information System (C4I) Combat Survival Evader Locator (CSEL), Region/Sector Operations Control Center (R/SOCC), Military Airspace Management System (MAMS), Modular Control Equipment (MCE P31), Military Microwave Landing Sys-Avionics (MMLSA), AMC C-2 Info Processing System II-IV, DMSP Small Tactical Terminal (DMSP-STT), Advanced Training System (ADV TNG SYS), Improve-ment of Selected Intelligence Data Handling (IDHS), JOINT STARS, E3 Radar System Improvement Program (E3 RSIP), JTIDS Class 2 Terminal Multiservice (JTIDS CL2), CSD-Warime Medical System (CSD-WARMED), Combat Intelligence System (CIS), Modular TACC (CTAPS), Cloud Depiction and Forecast System II (CDFS II), Theater Missile Defense-C4I (TMD-C4I), Combat ID/Cooperative Aircraft ID (CI/CAI), and E4B Mod Miniature Receive Terminal (E4B MMRT).
- (U) Category: General Chemically Hardened Air Transportable Hospital (CHATH), ABO-Armored Multi-Role Vehicle (ABO-ARMRV), ABO-Anti-Penetration Tactical Shelters (ABO-TAC), AFF Crash/Fire, RRR-Mat Anchoring, CCD-Simulation, CCD-Vertical Smoke and Obscurant (CCD-V Smoke), CCD-Laser Warning/Laser Defeat (Laser), CCD-Runway Signature Characterization Disguise (CCD-RSCD), CSD-Transportable Blood Transshipment Center (CSD-TBTC), HMCS, SAB-Electric Rapid Utility Repair Kits (RURK), SAB-Water RURK, ABO-EOD/Medical Protective Shield (ABO-EOD Shield), ABO-Mobile Ordnance Disrupter System (MODS), RRR-Deployable Pavement Repair System, ABO-Rapid Ordnance Removable System (ABO-RORS), BISS Active Denial System, Environmental Control Unit (ECU) Replacement, ABO-Aircraft Expedient Dispersal Tech, ABO-EHR Munitions Stores Bins/Containers, CCD-Speed Trap, Semi-hardened Air Mobile Structures (Airmob Struct), SAB-POL RURK, and LS-Advanced Night Vision System (LS-ANVS), CCD-Multispectral Nets (CCS-MS Nets), CCD-Ground Jammer, and AGM-130 Integration.

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)				DATE	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE			
6 - Management Support		0605712F Initial Operational Test & Eval		February 1995 0191	
(U) <u>B. Program Change Summary (\$ in Thousands):</u>					
(U) Previous President's Budget	FY 1994	FY 1995	FY 1996	FY 1997	Total Cost
(U) Appropriated Value	27,656	33,504	24,629	27,055	Cont
(U) Adjustments to Appropriated Value		33,504			
a. Cong Gen Reductions		-500			
b. Below Threshold Reprogramming	-600				
(U) Adjustments to budget years since FY 95 PB			-123	-134	
(U) Current Budget Submit/President's Budget	27,056	33,004	24,506	26,921	Cont
(U) Change Summary Explanation:					
Funding: None.					
Schedule: None.					
Technical: None.					
(U) <u>C. Other Program Funding Summary (\$ in Thousands):</u> Not applicable.					
(U) <u>D. Schedule Profile:</u> Not applicable.					

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February 1995
BUDGET ACTIVITY											
6 - Management Support											
PE NUMBER AND TITLE											
0605807F Test And Evaluation Spt											
COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Total Program Element (PE) Cost	495,918	483,821	454,067	458,335	482,628	482,541	477,028	476,823	Continuing	TBD	
06TS Test and Evaluation Support/6606TS (1)	379,871	365,365	330,727	334,054	349,235	344,258	349,725	346,673	Continuing	TBD	
06AS Aircraft Support/6606AS (2)	37,436	34,476	12,539	12,229	13,211	13,930	15,140	16,388	Continuing	TBD	
06MC Minor Construction/6606MC (3)	4,245	3,243	3,660	3,738	3,914	4,106	4,228	4,354	Continuing	TBD	
06MR Maintenance and Repair/6606MR (4)	45,019	51,183	84,354	86,135	93,188	96,187	83,132	83,868	Continuing	TBD	
06TG 46 Test Group/6606TG (5)	29,347	29,554	22,787	22,179	23,080	24,060	24,803	25,540	Continuing	TBD	

Note: Beginning in FY 96, \$26,400 is transferred from this PE to PE 0605896F Base Operating Support. The following FY 94/95 funding totals (dollars in thousands) represent what the totals would be considering a reduction of \$26,400 in each year. (See Note 1 below.) These totals provide a more meaningful funding trend analysis for this PE.

FY 1994 FY 1995

469,518 457,421

Total PE

353,471 338,965

Project 6606TS

- (1) Test and Evaluation Support, project 6606TS, was combined from projects 06RB, 06YA, and 06ZA in this PE. (FY 94 includes project 06UC and 1013; FY 95 includes project 06UC). Base Operating Support (BOS) funds (\$26,400 in FY 96) were transferred from PE 0605807 (Arnold Engineering Development Center) into PE 0605896F. The purpose of the transfer is to more evenly account for BOS-type efforts within PE 0605896F at the three major AF test centers. Similarly, approximately \$26,000 has also been transferred in FY 97-01.
- (2) Aircraft Support, project 6606AS, was transferred from PE 0605863F (combining projects 662111 and 662112), effective FY 96. Funding in FY 94/95 refers to PE 0605863F.
- (3) Minor Construction, project 6606MC, was transferred from PE 0605876F, effective FY 96. Funding in FY 94/95 refers to PE 0605876F.
- (4) Maintenance and Repair, project 6606MR, was transferred from PE 0605878F, effective FY 96. Funding in FY 94/95 refers to PE 0605878F.
- (5) 46 Test Group, project 6606TG, was transferred from PE 0605708F, effective FY 96. FY 94/95 totals include both the test infrastructure and test investment portion of PE 0605708F. Beginning in FY 96, the funding in this project is only for test infrastructure. The investment portion transfers to PE 0604256F.

(U) A. **Mission Description and Budget Item Justification:** This program element consolidates five PEs (or portions thereof) as mentioned above. The aircraft support project provides resources for maintaining Air Force Materiel Command (AFMC) assigned test and test support coded aircraft which are included as a portion of the Department of Defense Major Range and Test Facility Base (MRTFB). The Minor Construction project provides essential minor construction at the three Air Force MRTFBs (Eglin AFB FL, Edwards AFB CA, and Arnold AFB TN). The Maintenance and Repair project provides real property maintenance and repair at the three MRTFBs. The 46 Test Group (46TG) project provides the following unique capabilities as part of the DoD MRTFB: the High Speed Test Track (HSTT), Central Inertial Guidance Test Facility (CIGTF), and the Radar Target Scatter (RATSCAT) facility. The Test and Evaluation (T&E) Support program provides resources to operate the above Air Force test activities.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

6 - Management Support 0605807F Test And Evaluation Spt

(U) B. Program Change Summary (\$ in Thousands):

	FY 1994	FY 1995	FY 1996	FY 1997	Total Cost
(U) Previous President's Budget	524,253	489,155	516,670	525,327	Cont
(U) Appropriated Value		489,984			
(U) Adjustments to Appropriated Value					
a. Cong Gen Reductions		-5,338			
b. Omnibus or Other Above Threshold Reprogramming		-825			
c. Below Threshold Reprogramming	-28,335				
(U) Adjustments to budget years since FY 95 PB			-62,603	-66,992	
(U) Current Budget Submit/President's Budget	495,918	483,821	454,067	458,335	Cont

(U) Change Summary Explanation:

Funding: FY 94/95 totals include funding from PEs 0605807F, 0605863F, 0605876F, 0605878F, and 0605708F. For Test and Evaluation Support (6606TS), beginning in FY 96, this project was combined from projects 06RB, 06YA, and 06ZA which, in prior years was PE 0605807F. (FY 94 funding includes project 06UC (Utah Test and Training Range) and Project 1013 (4950th TW); FY 95 funding includes project 06UC). In FY 96, \$26,400 in Base Operating Support (BOS) funds were transferred from PE 0605807 (Arnold Engineering Development Center project) into PE 0605896F (Base Operations Support). The purpose of the transfer is to standardize the BOS-type efforts within PE 0605896F at the three major AF test centers. Similarly, approximately \$26,000 has also been transferred in FY 97-01. Beginning in FY 96, funding has been transferred from the Defense Business Operating Fund (DBOF) to pay for T&E financial reporting (\$6,700 in FY 96, and \$10,900 in FY 97). For Aircraft Support (6606AS), beginning in FY 96, customers will be charged a pro-rata share base on aircraft usage. For Maintenance and Repair (6606MR), changes due to civilian pay repricing and results of Commander's Facility Assessment exercise. For 46 Test Group (6606TG), changes reflect a civilian pay reprice.

Schedule: For Aircraft Support (6606AS), minor schedule adjustments occur based on changes to program priority requirements.
Technical: None.

(U) C. Other Program Funding Summary (\$ in Thousands): Not applicable.

Related RDT&E:

(U) PE 0605856F, Environmental Compliance
 (U) PE 0605896F, Base Operations RDT&E (Base operating support)
 (U) PE 0604759F, Major T&E Investment (Technical capability improvement and modernization)
 (U) PE 0604940D, Central Test & Evaluation Improvement Program (T&E investments for new tri-service test capabilities)

(U) D. Schedule Profile: Not applicable.

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

6 - Management Support

0605807F Test And Evaluation Spt

06TS

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
06TS Test and Evaluation Support/6606TS (1)	379,871	365,365	330,727	334,054	349,235	344,258	349,725	346,673	Continuing	TBD

(1) Test and Evaluation Support, project 6606TS, was combined from projects 06RB, 06YA, and 06ZA in this PE. (FY 94 includes project 06UC and 1013; FY 95 includes project 06UC). Base Operating Support (BOS) funds (\$26,400 in FY 96) were transferred from PE 0605807 (Arnold Engineering Development Center) into PE 0605896F. The purpose of the transfer is to more evenly account for BOS-type efforts within PE 0605896F at the three major AF test centers. Similarly, approximately \$26,000 has also been transferred in FY 97-01.

(U) **A. Mission Description and Budget Item Justification:** This project provides resources to operate the Air Force test activities which are included in the Department of Defense (DoD) Major Range and Test Facility Base (MRTFB). Test facilities/capabilities operated through this program include wind tunnels, rocket and jet engine test cells, space environmental simulation chambers, armament test ranges, climatic test facilities, avionics test facilities, aircraft testbeds, dry lakebed landing sites, and instrumented test ranges. T&E Support funds test infrastructure overhead activities including: command and supervisory staffs; supply stocks; upkeep, refurbishment, repair, and replacement of worn or obsolete test equipment; test infrastructure for data collection, transmission, reduction, and analysis; civilian salaries; temporary duty travel; support contract costs for hardware and software engineering and maintenance; and minor improvement and modernization projects. Three major Air Force test centers are supported by this project: (1) Arnold Engineering and Development Center (AEDC) which provides the test infrastructure overhead support to operate the largest complex of ground test facilities in the free world (includes transonic, supersonic, and hypersonic wind tunnels; rocket motor and turbine engine test cells; space environmental test chambers, hyperballistic ranges; and other specialized facilities). (2) Air Force Flight Test Center (AFFTC), Edwards AFB CA which provides test infrastructure overhead support for development and operational test and evaluation support for aircraft and aircraft systems, aerospace research vehicles, unmanned miniature vehicles, cruise missiles, parachute delivery/recovery systems, and cargo handling systems. The AFFTC also operates the Utah Test and Training Range (UTTR) in Northwest Utah. T&E overhead support capability for UTTR will be severely curtailed in FY 96 and out. In FY 94, most of the 4950th Test Wing funding transferred to AFFTC. The remaining funds were used to support the Aircraft Modification Directorate, previously called Developmental Manufacturing and Modification Facility (DMMF). (3) Air Force Development Test Center (AFDTC), Eglin AFB FL which provides the test infrastructure overhead support for non-nuclear air armaments (including aircraft guns, ammunition, bombs, and missiles) and Electronic Warfare (EW) systems for DoD and allied forces. AFDTC provides a scientific test process that supports the development and enhancement of munitions and EW systems. This process reduces the risk of acquisition programs and ensures military equipment will work in the combat environment.

(U) FY 1994 Program:

(U) Arnold Engineering Development Center

- (U) Continued test infrastructure overhead support to enable testing for classified programs, and the F-15, F-16, F-18E/F, F-22, B-1 Conventional Stores Certification, Ballistic Missile Defense Organization (BMDO) and other unclassified programs, and provided for ASTF icing capability to support advanced aircraft test needs. (\$147,471)

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 1995
BUDGET ACTIVITY 6 - Management Support		PROJECT 06TS
PE NUMBER AND TITLE 0605807F Test And Evaluation Spt		

(U) DMMF (Aircraft Modification Directorate)

- (U) Funded indirect labor and supporting expenses (training, travel, office supplies, etc.) and support services required for the DMMF mission in support of RBA programs in excess of \$27,600. (\$6,000)

(U) Air Force Flight Test Center

- (U) Continued to provide test infrastructure overhead support enabling testing of the B-1B, B2, F-16, F-15, F-15E, F-22, AFTI/F-16, Gunship/Combat Talon II, C-17, Benefield Anechoic Facility, ARIA, SMILS, ECCM/ARTB, and classified programs. (\$130,700)
- (U) USAF Test Pilot School operating costs. (\$17,000)

(U) Air Force Development Test Center

- (U) Continued test infrastructure overhead support for non-nuclear air armaments (AMRAAM, SEEK EAGLE, TMD, JDAM, JSOW, and AIM-9X); climatic simulation (B-2, etc.) (1st qtr); electronic warfare (JSTARS, F15-TEWS, etc.); C4I (JTIDS, AWACS, BISS, Combat Intelligence Systems, Combat Weather Systems, etc.) (\$78,700)

(U) FY 1995 Planned Program:

(U) Arnold Engineering and Development Center

- (U) Continue test infrastructure overhead support to enable testing for classified programs, and unclassified programs (F-22, JDAM, F-15, F-16, Minuteman, and F-18. (\$144,711)

(U) DMMF (Aircraft Modification Directorate):

- (U) Fund indirect labor and supporting expenses (training, travel, office supplies, etc.) and support services required for the DMMF mission in support of RBA programs in excess of \$25,900. (\$2,976)

(U) Air Force Flight Test Center

- (U) Continue to provide test infrastructure overhead support enabling testing of the B-1B, B2, F-16, F-15, F-15E, F-22, AFTI/F-16, Gunship/Combat Talon II, C-17, Benefield Anechoic Facility, ARIA, SMILS, ECCM/ARTB, and classified programs. (\$121,283)
- (U) USAF Test Pilot School operating costs. (\$17,500)
- (U) Fund US test pilots to attend foreign test pilot schools. (\$2,700)

(U) Air Force Development Test Center

- (U) Continued test infrastructure overhead support for non-nuclear air armaments (AMRAAM, SEEK EAGLE, TMD, JDAM, JSOW, ASRAAM, and AIM-9); electronic warfare (JSTARS, F15-TEWS, etc.); C4I (JTIDS, AWACS, BISS, Combat Intelligence Systems, Combat Weather Systems, etc.); and refurbishment of the Climatic Test Facility. (\$76,195)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE	February 1995
PROJECT	06TS
PE NUMBER AND TITLE	0605807F Test And Evaluation Spt
BUDGET ACTIVITY	6 - Management Support

(U) FY 1996 Planned Program:

(U) Arnold Engineering and Development Center

- (U) Continue test infrastructure overhead support to enable testing for classified programs, and unclassified programs (F-22, JDAM, F-15, F-16, Minuteman, and F-18. (\$114,431)

(U) DMMF (Aircraft Modification Directorate):

- (U) Fund indirect labor and supporting expenses (training, travel, office supplies, etc.) and support services required for the DMMF mission in support of RBA programs in excess of \$25,900. (\$2,000)

(U) Air Force Flight Test Center

- (U) Continue to provide test infrastructure overhead support enabling testing of the B-1B, B2, F-16, F-15, F-15E, F-22, AFTI/F-16, Gunship/Combat Talon II, C-17, Benefield Anechoic Facility, ARIA, SMILS, ECCM/ARTB, and classified programs. (\$113,649)
- (U) USAF Test Pilot School operating costs. (\$18,000)

(U) Air Force Development Test Center

- (U) Continued test infrastructure overhead support for non-nuclear air armaments (AMRAAM, SEEK EAGLE, TMD, JDAM, JSOW, etc.) electronic warfare (JSTARS, F15-TEWS, etc); C4I (JTIDS, AWACS, BISS, AFMSS), and refurbishment of the Climatic Test Facility (\$75,947)

(U) Financial Reporting Support: Provide funding from Defense Business Operating Fund (DBOF) for T&E financial reporting. (\$6,700)

(U) FY 1997 Planned Program:

(U) Arnold Engineering and Development Center

- (U) Continue test infrastructure overhead support to enable testing for classified programs, and unclassified programs (F-22, JDAM, F-15, F-16, Minuteman, and F-18. (\$115,240)

(U) DMMF (Aircraft Modification Directorate):

- (U) Fund indirect labor and supporting expenses (training, travel, office supplies, etc.) and support services required for the DMMF mission in support of RBA programs in excess of \$25,900. (\$2,000)

(U) Air Force Flight Test Center

- (U) Continue to provide test infrastructure overhead support enabling testing of the B-1B, B2, F-16, F-15, F-15E, F-22, AFTI/F-16, Gunship/Combat Talon II, C-17, Benefield Anechoic Facility, ARIA, ECCM/ARTB, and classified programs. (\$112,241)
- (U) USAF Test Pilot School operating costs. (\$18,600)

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06TS

- (U) Air Force Development Test Center
- (U) Continued test infrastructure overhead support for non-nuclear air armaments (AMRAAM, SEEK EAGLE, TMD, JDAM, JSOW, WCMD, etc.); electronic warfare (ISTARS, F15-TEWS, F-16 ALR 56M, etc); C4I (JTIDS, BISS, TMD), and aircraft software upgrades. (\$75,073)
- (U) Financial Reporting Support: Provide funding from Defense Business Operating Fund (DBOF) for T&E financial reporting. (\$10,900)

(U) B. Program Change Summary (\$ in Thousands):

	FY 1994	FY 1995	FY 1996	FY 1997	Total
(U) Previous President's Budget	399,930	373,376	387,857	395,038	Cost
(U) Appropriated Value		370,300			Cont
(U) Adjustments to Appropriated Value					
a. Cong Gen Reductions		-4,869			
b. Omnibus or Other Above Threshold Reprogramming		-66			
c. Below Threshold Reprogramming	-20,059		-57,130	-60,984	
(U) Adjustments to budget years since FY 95 PB					
(U) Current Budget Submit/President's Budget	379,871	365,365	330,727	334,054	

(U) Change Summary Explanation:

Funding: In FY 96, this project was combined from projects 06RB, 06YA, and 06ZA which comprised PE 0605807F. (FY 94 includes project 06UC (Utah Test and Training Range) and Project 1013 (4950th TW); FY 95 includes project 06UC). In FY 96, \$26,400 in Base Operating Support (BOS) funds were transferred from PE 0605807 (Arnold Engineering Development Center project) into PE 0605896F. The purpose of the transfer is to more evenly account for BOS-type efforts within PE 0605896F at the three major AF test centers. Similarly, approximately \$26,000 has also been transferred in FY 97-01. Beginning in FY 96, funding has been transferred from the Defense Business Operating Fund (DBOF) to pay for T&E financial reporting (\$6,700 in FY 96, and \$10,900 in FY 97). Additional cuts were taken as part of the overall DoD budget reductions.

Schedule: None.

Technical: None.

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6 - Management Support	0605807F Test And Evaluation Spt	06TS	
<p>(U) C. <u>Other Program Funding Summary (\$ in Thousands)</u>: Not applicable.</p> <p>Related RDT&E:</p> <p>(U) PE 0605856F, Environmental Compliance</p> <p>(U) PE 0605896F, Base Operations RDT&E (Base operating support)</p> <p>(U) PE 0604759F, Major T&E Investment (Technical capability improvement and modernization)</p> <p>(U) PE 0604940D, Central Test & Evaluation Improvement Program (T&E investments for new tri-service test capabilities)</p> <p>(U) D. <u>Schedule Profile</u>: Not applicable.</p>			

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PROJECT

06AS

		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
	COST (In Thousands)										
06AS	Aircraft Support/6606AS (2)	37,436	34,476	12,539	12,229	13,211	13,930	15,140	16,388	Continuing	TBD

(1) Aircraft Support, project 6606AS, was transferred from PE 0605863F (combining projects 662111 and 662112), effective FY 96. Funding in FY 94/95 refers to PE 0605863F.

(U) **A. Mission Description and Budget Item Justification:** The RDT&E aircraft support program provides resources for maintaining Air Force Materiel Command (AFMC) assigned test and test support coded aircraft which are included as a portion of the Department of Defense Major Range and Test Facility Base (MRTFB). This program supports 160 RDT&E aircraft of 18 different types. These include a multitude of configurations, with many prototype, preproduction, and extensively modified/instrumented one-of-a-kind aircraft. Funds pay for depot level maintenance such as: Programmed Depot Maintenance (PDM), the calendar-based cyclic scheduling of aircraft into depots for update/inspection, modifications and any other depot level repairs required by the aircraft System Program Directors (SPD); engine overhauls and engine modules; depot-provided area assistance; and assorted ground support equipment overhauls that require reimbursement.

- (U) FY 1994
 - (U) Performed PDM and engine overhauls. (\$37,436)
- (U) FY 1995
 - (U) Perform PDM and engine overhauls. (\$34,476)
- (U) FY 1996
 - (U) Perform PDM and engine overhauls. (\$12,539)
- (U) FY 1997
 - (U) Perform PDM and engine overhauls. (\$12,229)

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BUDGET ACTIVITY		PE NUMBER AND TITLE				
6 - Management Support		0605807F Test And Evaluation Spt				
(U) B. <u>Program Change Summary (\$ in Thousands):</u>						
(U) Previous President's Budget		FY 1994	FY 1995	FY 1996	FY 1997	Total
(U) Appropriated Value		42,157	34,476	41,308	41,058	Cost
(U) Adjustments to Appropriated Value			34,476			Cont
a. Below Threshold Reprogramming						
(U) Adjustments to budget years since FY 95 PB		-4,721		-28,769	-28,829	
(U) Current Budget Submit/President's Budget		37,436	34,476	12,539	12,229	Cont
(U) Change Summary Explanation:						
Funding: Beginning in FY 96, customers will be charged a pro-rata share base on aircraft usage.						
Schedule: Minor schedule adjustments occur based on changes to program priority requirements.						
Technical: None.						
(U) C. <u>Other Program Funding Summary (\$ in Thousands):</u> Not applicable.						
Related RDT&E:						
(U) PE 0605856F, Environmental Compliance						
(U) PE 0605896F, Base Operations RDT&E (Base operating support)						
(U) PE 0604759F, Major T&E Investment (Technical capability improvement and modernization)						
(U) PE 0604940D, Central Test & Evaluation Improvement Program (T&E investments for new tri-service test capabilities)						
(U) D. <u>Schedule Profile:</u> Not applicable.						

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BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
6 - Management Support		0605807F Test And Evaluation Spt								06MC	
	COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
06MC Minor Construction/6606MC (3)		4,245	3,243	3,660	3,738	3,914	4,106	4,228	4,354	Continuing	TBD

(1) Minor Construction, project 6606MC, was transferred from PE 0605876F, effective FY 96. Funding in FY 94/95 refers to PE 0605876F.

(U) **A. Mission Description and Budget Item Justification:** This program element provides essential minor construction at three DoD Major Range and Test Facility Base locations: Eglin AFB FL, Edwards AFB CA, and Arnold AFB TN. Physical plant maintained by this account covers 800,000 acres of land; over four thousand structures in excess of 30 years old encompassing fifteen million square feet; over five million square yards of airfield pavement; 1900 miles of road network; utility systems that include 120 wells, 10 sewage treatment plants, 20 substations and over 1600 miles of high voltage electrical distribution lines.

(U) FY 1994 Program:

- (U) Financed in-house work performed by government employees and includes supplies, materials and equipment; financed installation of taxiway lighting and replaced propulsion wind tunnel transformer, and altered aeropropulsion systems test facility control room and financed Federal Emergency Management Program projects. (\$4,245)

(U) FY 1995 Planned Program:

- (U) Finance in-house work force (supplies, materials and equipment) and perform most critical minor construction at the three MRTFBs. (\$3,243)

(U) FY 1996 Planned Program:

- (U) Finances in-house work force (supplies, materials and equipment); replace plenum escape system transformer and add 16KV circuit breaker to plenum escape system substation; and finance addition to equipment research laboratory and provide additional well reservoir. (\$3,660)

(U) FY 1997 Planned Program:

- (U) Finances in-house work force (supplies, materials and equipment); provide additions to fire station and base supply and equipment warehouse and alter various facilities to promote access to physically challenged persons. (\$3,738)

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06MC

(U) B. Program Change Summary (\$ in Thousands):

(U) Previous President's Budget

(U) Appropriated Value

(U) Adjustments to Appropriated Value

a. Cong Gen Reductions

b. Below Threshold Reprogramming

(U) Adjustments to budget years since FY 95 PB

(U) Current Budget Submit/President's Budget

Total
Cost
Cont

FY 1994

7,739

7,739

FY 1995

3,281

3,281

FY 1996

3,678

FY 1997

3,757

-38

-3,494

-18

-19

Total

Cost

Cont

(U) Change Summary Explanation:

Funding: None.

Schedule: None.

Technical: None.

(U) C. Other Program Funding Summary (\$ in Thousands): Not applicable.

Related RDT&E:

(U) PE 0605856F, Environmental Compliance

(U) PE 0605896F, Base Operations RDT&E (Base operating support)

(U) PE 0604759F, Major T&E Investment (Technical capability improvement and modernization)

(U) D. Schedule Profile: Not applicable.

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BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
6 - Management Support		0605807F Test And Evaluation Spt								06MR	
	COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
06MR	Maintenance and Repair/6606MR (4)	45,019	51,183	84,354	86,135	93,188	96,187	83,132	83,868	Continuing	TBD

(1) Maintenance and Repair, project 6606MR, was transferred from PE 0605878F, effective FY 96. Funding in FY 94/95 refers to PE 0605878F.

(U) **A. Mission Description and Budget Item Justification:** This project provides essential Real Property Maintenance and Repair at three DoD Major Range and Test Facility Base (MRTFB) locations: Eglin AFB FL, Edwards AFB CA, and Arnold AFB TN. Physical plant maintained by this account covers 800,000 acres of land; over four thousand structures in excess of 30 years old encompassing fifteen million square feet; over five million square yards of airfield pavement; 1900 miles of road network; utility systems that include 120 wells, 10 sewage treatment plants, 20 substations and over 1600 miles of high voltage electrical distribution lines. Beginning in FY 96, the increases represent an Air Force corporate decision to implement a new initiative to measure and improve facility conditions: the Commander's Facility Assessment (CFA). CFA puts a "readiness face" on real property maintenance requirements by having commanders at all levels assess their facility's condition and its impact on mission accomplishment. Facilities are assessed as either Level 1 (Unsatisfactory - minimal mission support) or Level 2 (Degraded - impaired mission support). The field commanders have unanimously endorsed CFA as the best way to determine and address mission impacts due to facility deficiencies. The program increases represent a concerted effort to fund the majority of the Level 1 requirements with a particular emphasis on operational facilities and base infrastructure. Recently, a combined Air Staff (HQ USAF) and Air Force Materiel Command (AFMC) team visited Edwards AFB to better understand the MRTFB real property maintenance (RPM) requirements. It was readily apparent that the CFA results indicating significant PRM requirements was accurate. The base's poor condition clearly reflects the historically inadequate RPM funding for the MRTFBs. Beginning in FY96, we start funding RPM at reasonable levels to adequately support the unique test mission of these bases.

(U) FY 1994 Program:

- (U) Financed in-house M&R work force (payroll, supplies, materials and equipment). (\$34,619)
- (U) Funded repair of roofs, 11 test facility valves, airfield asphalt, and repairs to building 5605 (Noncommissioned Officer Quarters). (\$8,300)
- (U) Funded repair to electrical lines, painting exteriors of 144 buildings, cylinders repair at propulsion wind tunnel, and repairs to helipad. (\$2,100)

(U) FY 1995 Planned Program:

- (U) Finance in house work force. (\$33,883)
- (U) Finance repairs to engine test facility, airfield asphalt and runway, overhead lines, Visiting Airmen Quarters (VAQ), electrical substation and various sewer lines. (\$8,600)
- (U) Perform various M&R activities (overlay roads, repair aftercooler bundles, transformers, rotor discs, hangar doors, HVAC (heating, ventilation and air conditioning) in various buildings. (\$8,700)

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06MR

- (U) FY 1996 Planned Program:
- (U) Finance in house work force. (\$38,254)
 - (U) Repair heat exchangers in engine test facility, 26,500 hp rotor and starter, process air valve, liquid rheostats and water manifolds. (\$13,800)
 - (U) Repair various water and sewer lines, dorms, circuit breakers and various roofs. (\$11,600)
 - (U) Commander's Facility Assessment (CFA) exercise identified requirements necessary to improve facilities rated unsatisfactory up to an adequate level at the three MRTFB locations. (\$20,700)
- (U) FY 1997 Planned Program:
- (U) Finance in-house work force. (\$39,535)
 - (U) Repair refrigerant insulation, rotor discs, gaseous helium refrigerators, heaters in air processing system and water control valves. (\$13,600)
 - (U) Repair various roads, underground cable, HVAC (heating, ventilation and air conditioning), airfield pavement, electrical distribution lines and re-roof buildings. (\$12,700)
 - (U) CFA exercise identified requirements necessary to improve facilities rated below satisfactory up to a satisfactory level at the three MRTFB locations. (\$20,300)

(U) B. Program Change Summary (\$ in Thousands):

	FY 1994	FY 1995	FY 1996	FY 1997	Total
	Cost	Cost	Cost	Cost	Cost
(U) Previous President's Budget	46,020	51,904	58,092	59,416	
(U) Appropriated Value					
(U) Adjustments to Appropriated Value					
a. Cong Gen Reductions		-721			
b. Below Threshold Reprogramming	-1,001				
(U) Adjustments to budget years since FY 95 PB			26,262	26,719	
(U) Current Budget Submit/President's Budget	45,019	51,183	84,354	86,135	Cont

(U) Change Summary Explanation:

Funding: Changes due to civilian pay repricing and results of Commander's Facility Assessment exercise.

Schedule: None.

Technical: None.

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6 - Management Support	0605807F Test And Evaluation Spt	06MR	
<p>(U) C. <u>Other Program Funding Summary (\$ in Thousands)</u>: Not applicable.</p> <p>Related RDT&E:</p> <ul style="list-style-type: none">(U) PE 0605856F, Environmental Compliance(U) PE 0605896F, Base Operations RDT&E (Base operating support)(U) PE 0604759F, Major T&E Investment (Technical capability improvement and modernization)(U) PE 0604940D, Central Test & Evaluation Improvement Program (T&E investments for new tri-service test capabilities) <p>(U) D. <u>Schedule Profile</u>: Not applicable.</p>			

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06TG

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
06TG 46 Test Group/6606TG (5)	29,347	29,554	22,787	22,179	23,080	24,060	24,803	25,540	Continuing	TBD

(1) 46 Test Group, project, 6606TG, was transferred from PE 0605708F, effective FY 96. FY 94/95 totals include both the test infrastructure and test investment portion of PE 0605708F. Beginning in FY 96, the funding in this project is only for test infrastructure. The investment portion transfers to PE 0604256F.

(U) **A. Mission Description and Budget Item Justification:** Beginning in FY 96, this project funds only test infrastructure overhead support including: command and supervisory staffs; supply stocks; upkeep, refurbishment, repair, and replacement of non-repairable or obsolete test equipment; test infrastructure for data collection, transmission, reduction, and analysis; civilian salaries, utilities, temporary duty travel, support contract costs for hardware and software engineering and maintenance. Project infrastructure support is provided for the unique capabilities of the 46th Test Group facilities: the High Speed Test Track (HSTT), Central Inertial Guidance Test Facility (CIGTF), and the Radar Target Scatter (RATSCAT) facility. In FY 94/95 part of the funding was for investment programs: Radar Target Scatter (RATSCAT), Aircraft Navigation System Verification, and the Hypersonic Sled Track Development programs. The RATSCAT program transferred to PE 0604256F in FY 96. There is no Air Force funding in FY 96 and beyond for either the Aircraft Navigation System Verification or the Hypersonic Sled Track Development programs.

(U) FY 1994 Program:

Infrastructure

- (U) Provided infrastructure test support for programs such as Advanced Inertial Measurement System (AIMS), Minuteman III, IRCM, TMD, PAC-3, F-111, Arrow, GBI, FAA GPS Precision Approach field tests, GPS integrated and imbedded INS programs, aircraft navigation systems, Standard Missile II, Advanced Tactical Infrared Countermeasures, F-22 egress testing, Fourth Generation Seat egress testing, Theater High Altitude Area Defense (THAAD) lethality testing, Special Infrared (SIR) flare testing, and Static RCS testing for both classified and unclassified programs, including the F-117A; began development of an automated trajectory system to reduce the cost of egress, flare and IRCM testing at the sled track deferred from FY 92; supported the development a magnetic levitation prototype system at the sled track; and replaced obsolete data acquisition/computer systems for CIGTF. (\$21,847)

Investments

- (U) Continued test support operations for Aircraft Navigation System Verification; continued RATSCAT upgrades; and developed designs and prototypes for the construction of a magnetic levitation system. (\$7,500)

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(U) FY 1995 Planned Program:

- (U) Provide infrastructure test support for programs such as AIMS, Minuteman III, IRCM, TMD, THAAD, PAC-3, F-111, Arrow, GBI, standard missile, FAA GPS Precision Approach field tests, GPS integrated and imbedded INS programs, aircraft navigation systems, Joint Primary Aircraft Training System egress testing, and static RCS testing for both classified and unclassified programs including the F-117A; complete development of an automated trajectory system to reduce the cost of egress, flare and IRCM testing at the sled track deferred from FY 92; continue development activities for the magnetic levitation system; and acquire updated computer systems to improve sled design development activities. (\$22,554)

Investments

- (U) Continued test support operations for Aircraft Navigation System Verification; continued RATSCAT upgrades; and continue magnetic levitation system development. (\$7,000)

(U) FY 1996 Planned Program:

- (U) Provide infrastructure test support for programs such as IRCM, Peacekeeper, THAAD, F-111, Sparrow, Corps SAM, Standard Missile, FAA GPS Precision Approach field tests, GPS integrated and imbedded INS programs, aircraft navigation systems, F-22 and Joint Primary Aircraft Training System egress testing, and static RCS testing for both classified and unclassified programs including the F-117A; initiate acquisition of special avionics to support GPS integration and testing; continue development activities for the magnetic levitation system; and initiate procurement of equipment for the target fabrications facility at the High Speed Test Track. (\$22,787)

(U) FY 1997 Planned Program:

- (U) Provide infrastructure test support for programs such as A-10, IRCM, Peacekeeper, THAAD, Hellfire F/O, Corps SAM, Standard Missile, FAA GPS Precision Approach field tests, GPS integrated and imbedded INS programs, aircraft navigation systems, F-22 and Joint Primary Aircraft Training System egress testing, and static RCS testing for both classified and unclassified programs including the F-117A; complete acquisition of special avionics to support GPS integration and testing; continue development activities for the magnetic levitation system; and continue procurement of equipment for the target fabrications facility at the High Speed Test Track. (\$22,179)

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06TG

(U) B. Program Change Summary (\$ in Thousands):

	FY 1994	FY 1995	FY 1996	FY 1997	Total Cost Cont
(U) Previous President's Budget	28,313	26,023	25,639	25,961	
(U) Appropriated Value		30,023			
(U) Adjustments to Appropriated Value		-469			
a. Cong Gen Reductions					
b. Below Threshold Reprogramming	1,034				
(U) Adjustments to budget years since FY 95 PB					
(U) Current Budget Submit/President's Budget	29,347	29,554	22,787	22,179	Cont

(U) Change Summary Explanation:

Funding: Civilian pay reprice.

Schedule: None.

Technical: None.

(U) C. Other Program Funding Summary (\$ in Thousands): Not applicable.(U) D. Schedule Profile: Not applicable.

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BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.			
#6-RDT&E Management Support		PE 0605808F Development Planning								3361			
COST (\$ in Thousands)		FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost		
Development Planning		6,724	5,870	6,745	6,764	6,952	7,166	7,398	7,628	Continuing	TBD		

A. Mission Description and Budget Item Justification

The Air Force is in compliance with the DoD 5000 series regulations which mandate that a full range of requirements analyses be conducted to identify and substantiate current operational deficiencies through the Air Force Modernization Planning Process. This PE supports this process. This is a significant change and has a substantial impact on the pre-Milestone I process. First, a Mission Area Assessment (MAA) is conducted to identify tasks and subordinate operational deficiencies. These deficiencies must relate directly to assigned Air Force operational roles, missions, and supporting tasks that cannot be performed efficiently, or in a cost effective manner. Second, a Mission Needs Analysis (MNA) is conducted to identify potential cost effective, non-materiel and materiel alternatives that address the deficiency, or present new technological opportunities. Non-materiel alternatives include doctrine, tactics, training, and organizational changes. Materiel alternatives will include modification and review of all existing DoD, Allied and non-developmental systems, or development of new systems. Operational requirements analyses and supporting acquisition milestone documentation includes MAAs, MNAs, and Mission Need Statements (MNS). Phase 0 concepts studies and Cost and Operational Effectiveness Analyses (COEAS) are not normally conducted in this program element. This PE is in management support because the efforts perform operational requirements studies and analyses directed in support of assigned mission areas and mission area plans. Studies are competitively selected on a yearly basis. There is no unnecessary duplication of effort within the Air Force or DoD.

- (U) FY 1994 Accomplishments (Amts in Thousands of Dollars)
 - (U) Complete mission area assessment/mission needs analysis to identify most promising alternatives in the area of aircraft emanations detection/interceptibility and explore system integration factors that effectively enhance situation awareness. (581)
 - (U) Completed identification of architecture for in-theater weather prediction and determine operational utility of fusing meteorological satellite data with other meteorological data. (702)
 - (U) Continue mission needs analysis for destruction of non-emitting surface-to-air targets and investigate alternatives for incorporation into existing aircraft/munitions programs. (950)
 - (U) Continue IDEF (Integrated Definition for Functional Modeling) analysis of Air Mobility Command C2 processes-- resolve deficiencies. (1336)
 - (U) Continue surveillance and reconnaissance mission area assessment to identify architecture to support the battlefield commander. (726)
 - (U) Completed mission needs analysis for the next generation air-to-surface munitions. (494)
 - (U) Continue mission needs analysis for theater missile defense. (968)
 - (U) Continue mission needs analysis to identify options for hostile target identification-- transition selected options to existing programs. (968)
 - (U) Continue mission area assessment/mission needs analysis of C4I architectures for Theater Battle Management. (FY 93 Program- No FY 94 Funds)

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#6-RDT&E Management Support	PE 0605808F Development Planning	3361	
<p>(U) <u>FY 1995 Plans</u></p> <ul style="list-style-type: none"> - (U) Continue to identify operational deficiencies through Mission Area Assessments and Mission Needs Analysis - (U) Complete development of a merged IDEF Air Mobility Command and Control processes to identify mission area deficiencies and alternative concepts. (985) - (U) Complete mission needs analysis to identify and options for hostile target identification--transition selected options to existing programs. (785)) - (U) Complete mission need analysis for destruction of non-emitting surface-to-air targets and investigate alternatives for incorporation into existing aircraft/munitions programs. (390) - (U) Continue mission needs analyses for theater missile defense concepts. (943) - (U) Continue surveillance and reconnaissance mission area assessment to identify architecture alternatives to support the battlefield commander. (785) - (U) Continue mission area assessment/mission needs analysis of C4I architectures for Theater Battle Management. (153) - (U) Initiate IDEF mission area assessment of combat weather support requirements for worldwide AF and Army missions. (675) - (U) Initiate IDEF mission area assessment of intelligence systems. (528) - (U) Initiate mission area assessment to investigate cost savings in all aspects of space system life cycle costs. (314) - (U) Initiate mission area assessment tool definition for education and training missions to include student throughput, technological advances , and force structure changes. (208) - (U) Initiate mission needs analysis for next generation bare base operations. (104) <p>(U) <u>FY 1996 Plans and Potential Studies</u></p> <ul style="list-style-type: none"> - (U) Continue to identify operational deficiencies through Mission Area Assessments and Mission Needs Analysis. - (U) Complete IDEF intelligence functional area assessment tool to identify duplication in intelligence systems. - (U) Complete mission area assessment tool definition for education and training missions to include student throughput, technological advances, and force structure changes. - (U) Continue IDEF mission area assessment of combat weather support requirements for worldwide AF and Army missions and joint task forces. - (U) Continue mission needs analyses for theater missile defense concepts. - (U) Continue surveillance and reconnaissance mission area assessment to identify architecture to support the battlefield commander. - (U) Continue mission area assessment/mission needs analysis of C4I architectures for Theater Battle Management. - (U) Continue mission area assessment to investigate cost savings in all aspects of space system life cycle costs. - (U) Continue mission needs analysis for next generation bare base operations. 			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE February 1995
BUDGET ACTIVITY #6-RDT&E Management Support	PE NUMBER AND TITLE PE 0605808 Development Planning	PROJECT NO. 3361
<p>(U) <u>FY 1997 Plans and Potential Studies</u></p> <ul style="list-style-type: none">- (U) Transition IDEF intelligence functional area assessment tool to streamline operational intelligence systems.- (U) Continue to identify operational deficiencies through Mission Area Assessments and Mission Needs Analysis.- (U) Continue mission needs analyses for theater missile defense concepts.- (U) Continue IDEF mission area assessment of combat weather support requirements for worldwide AF and Army missions and joint task forces .- (U) Continue surveillance and reconnaissance mission area assessment to identify architecture alternatives to support the battlefield commander.- (U) Continue mission area assessment/mission needs analysis of C4I architectures for Theater Battle Management.- (U) Continue mission area assessment to investigate cost savings in all aspects of space system life cycle costs.- (U) Continue mission area assessment tool definition for education and training missions to include student throughput, technological advances, and force structure changes.- (U) Continue mission needs analysis for bare base operations.		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY		DATE		PROJECT NO.	
#6-RDT&E Management Support		February 1995		3361	
PE NUMBER AND TITLE		PE 0605808F Development Planning			
B. <u>Program Change Summary (\$ in Thousands)</u>					
Previous President's Budget	1994	1995	1996	1997	Total Cost
Appropriated Value	6,674	9,959	10,189	10,218	Continuing
Adjustments to Appropriated Value	6,724	7,500			
a. Cong Gen Reduction:		-1,590			
Adjustments to BY since FY 95 PB			-3,444	-3,454	
Current Budget Submit/President's Budget	6,724	5,870	6,745	6,764	Continuing
Change Summary Explanation:					
Funding: Listed Above					
Schedule: Not Applicable					
Technical: Not Applicable					
C. <u>Other Program Funding Summary (\$ in Thousands) and Related Activities:</u>					
(U) - Projects funded by this program element analyze potential nonmateriel and materiel alternatives that include integrating emerging technology into on-going weapon system programs. Army uses multiple O&M PEs (e.g. PE 0208015A and PE 0208018A) to support similar mission needs analyses. Navy uses multiple PEs (e.g. PE 0603763N and PE 0605853N) to support similar mission needs analyses.					
(U) - Joint Potential Designator to be determined at Milestone 1. PE only supports pre-Milestone 0 requirements analyses.					
(U) - There is no unnecessary duplication of effort within the Air Force.					
D. <u>Schedule Profile:</u> Not Applicable					

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	
BUDGET ACTIVITY										February, 1995	
PE NUMBER AND TITLE											
0605853F Environmental Conservation											
6 - Management Support											
	COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
4392 Environmental Conservation		0	0	14,169	14,070	14,578	14,767	14,685	14,682	Continuing	TBD
<p>(U) A. <u>Mission Description and Budget Item Justification</u></p> <p>This program element provides essential RDT&E Management Support for Environmental Conservation (CN) services at three Air Force Material Command Major Range and Test Facility Bases (MRTFBs): Eglin AFB, FL; Edwards AFB, CA; and Arnold AFB, TN. The account provides funds for Operations and Services (O&S), Level I (currently out of compliance with federal, state or local environmental law) and Level II (pending compliance deadline in the future) requirements. Typical projects/services include endangered species survey, monitoring and protection; National Environmental Protection Act Requirements for environmental assessments and environmental impact analysis; wetland and floodplain surveys; cultural resources evaluations; and archeological surveys. This program was moved from the environmental compliance program element (65856) to pay Level I (out of compliance) conservation costs.</p> <ul style="list-style-type: none"> - (U) <u>FY 1994</u> Program element did not exist this fiscal year. Program requirements were funded under environmental compliance program element (65856f). - (U) <u>FY 1995</u> Program element did not exist this fiscal year. Program requirements were funded under environmental compliance program element (65856f). - (U) <u>FY 1996</u> This program element was established by DoD to capture environmental conservation requirements required by laws and regulations. The entire amount of this program was moved from the environmental compliance program element (65856) to pay Level I (out of compliance) costs. This program has very few recurring requirements. Civilian pay is the major expense in the O&S category. Program funds surveys of endangered species (flora and fauna), wetlands, historic and archeological sites required by law. Florida and California both have laws requiring extensive surveys of facilities. (U) <u>FY 1997</u>. Costs are to survey and protect endangered species, wetlands, and historic and archeological sites that are required by federal and state laws. Survey generate plans and programs to preserve natural and cultural resources in compliance with state and federal requirements. Environmental Impact Statements are required for all actions that might affect resources. 											

Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE
BUDGET ACTIVITY										February, 1995
PE NUMBER AND TITLE										
0605854F Pollution Prevention										
6 - Management Support										
	COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Total Cost
1007 Pollution Prevention		0	0	14,046	21,361	6,965	4,975	6,134	6,301	Continuing
										TBD

(U) A. Mission Description and Budget Item Justification
 This program funds pollution prevention efforts required to accomplish the objectives and subobjectives of the Air Force Pollution Prevention Strategy at the Research and Development Activities Installations (Eglin, Arnold, and Edwards AFBs). It also funds efforts to validate and qualify environmentally acceptable materials and processes to replace existing common hazardous materials and processes. The account provides funds for Operations and Services (O&S), Level P1 (ozone depleting chemical and legal requirements), Level P2 (meet future Air Force goals, policies, and legal requirements), and Level P3 (beyond Air Force goals and legal requirements) projects. Typical project areas include eliminating the use of ozone depleting chemicals; reducing the generation of hazardous waste, air emissions, and wastewater, and the disposal of solid wastes; establishing and operating recycling and composting programs; and establishing hazardous material pharmacies. Prior to FY 96, all funding for this program was in program element (PE) 0708054F. To properly realign program funding into the appropriate major force programs and budget activities for the supported installations, additional PEs were established in Jul 94 (mandatory use starting in FY 96). All RDT&E funding in PE 0708054F was then realigned to PE 0605854F.

(U) FY 1994
 - (U) Program element did not exist this fiscal year. Program requirements were funded under pollution prevention PE 0708054F (RDT&E Appropriation).

(U) FY 1995
 - (U) Program element did not exist this fiscal year. Program requirements were funded under pollution prevention PE 0708054F (RDT&E Appropriation).

(U) FY 1996
 - (U) Funding of Eglin, Arnold, and Edwards AFBs pollution prevention requirements to include solid waste recycling, composting, hazardous waste minimization, and hazardous material management (\$4,169,000).
 - (U) Validation and qualification of commercially available material, equipment, and processes to support the Montreal Protocol and Air Force Pollution Prevention Strategy objectives and subobjectives in accordance with the Air Force Environmental Research and Development Strategic Plan (\$9,877,000).

(U) FY 1997
 - (U) Funding of Eglin, Arnold, and Edwards AFBs pollution prevention requirements to include solid waste recycling, composting, hazardous waste minimization, and hazardous material management (\$4,668,000).
 - (U) Validation and qualification of commercially available material, equipment, and processes to support the Montreal Protocol and Air Force Pollution Prevention Strategy objectives and subobjectives in accordance with the Air Force Environmental Research and Development Strategic Plan (\$16,693,000).

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

6 - Management Support

0605854F Pollution Prevention

(U) Acquisition Strategy: Not Applicable(U) B. Program Change Summary (\$ in Thousands)

	FY 1994	FY 1995	FY 1996	FY 1997	Total Cost TBD
(U) Previous President's Budget	0	0	0	0	
(U) Appropriated Value					
(U) Adjustments to Appropriated Value					
a.					
b.					
(U) Current Budget Submit/President's Budget	0	0	14,046	21,361	TBD

(U) Change Summary Explanation:

Funding: This program element was established to properly realign program funding into the appropriate budget structure (major force program and budget activity) for the supported installations. It reflects a transfer of RDT&E appropriation funding from PE 0708054F to PE 0605854F and covers installation level pollution prevention programs and evaluation of commercially available, environmentally acceptable materials and processes. Funding change between FY 96 and FY 97 reflects adjustments made in the program to increase efforts associated with eliminating the requirement for ozone depleting chemicals and reducing hazardous waste.

Schedule:

Technical:

(U) C. Other Program Funding Summary (\$ in Thousands): Not Applicable(U) D. Schedule Profile: Not Applicable

Exhibit R-2

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February, 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT		
6 - Management Support		0605856F Environmental Compliance								5856		
	COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
5856	Environmental Compliance	39,355	42,371	26,423	26,229	26,398	27,092	26,160	27,372	Continuing	TBD	

(U) A. Mission Description and Budget Item Justification

This program element provides essential RDT&E Management Support for Environmental Compliance (EC) services at three Air Force Material Command Major Range and Test Facility Bases (MRTFBs): Eglin AFB, FL; Edwards AFB, CA; and Arnold AFB, TN. The account provides funds for Operations and Services (O&S), Level I (currently out of compliance with federal, state or local environmental law) and Level II (pending compliance deadline in the future) and Level III (not currently under law, but will enhance the environment) requirements. Typical projects/services include hazardous waste management and disposal; upgrade and removal of underground fuel storage tanks; air and water pollution compliance projects; asbestos abatement and disposal; and polychlorinated biphenyl elimination. Also funds for environmental sampling and analysis, studies, testing and inspections; permits and fees. Funding for environmental conservation moved to PE 65853F in FY 96 and beyond.

(U) FY 1994 (\$ in millions)

- (U) \$25.6 in FY94 for essential "must pay" O&S requirements, such as civilian pay; hazardous waste disposal, environmental permits and fees.
- (U) \$13.7 funds Level I (out of compliance) requirements.

(U) FY 1995 (\$ in millions)

- (U) \$26.1 for essential "must pay" O&S requirements, such as civilian pay; hazardous waste disposal; and environmental permits and fees.
- (U) \$9.2 funds Level I (out of compliance) requirements.
- (U) \$7.1 will fund a limited number of projects classified as Level II (required to meet a future compliance date). Funding will only permit accomplishment of the most critical of these requirements that would go out of compliance during the program FY.

(U) FY 1996 (\$ in millions)

- (U) \$21.2 for essential "must pay" O&S requirements, such as civilian pay; hazardous waste disposal; and environmental permits and fees.
- (U) \$3.5 funds Level I (out of compliance) requirements.
- (U) \$1.7 will fund a limited number of projects classified as Level II (required to meet a future compliance date). Funding will only permit accomplishment of the most critical of these requirements that would go out of compliance during the program FY.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

0605856F Environmental Compliance

PROJECT

5856

6 - Management Support

(U) FY 1997 (\$ in millions)

- (U) \$21.0 for essential "must pay" O&S requirements, such as civilian pay; hazardous waste disposal; and environmental permits and fees.
- (U) \$2.9 funds Level I (out of compliance) requirements.
- (U) \$2.4 will fund a limited number of projects classified as Level II (required to meet a future compliance date). Funding will only permit accomplishment of the most critical of these requirements that would go out of compliance during the program FY.

(U) B. Program Change Summary (\$ in Thousands)

	FY 1994	FY 1995	FY 1996	FY 1997	Total Cost
(U) Previous President's Budget	39355	42876	38505	38334	TBD
(U) Appropriated Value	39575	42876			
(U) Adjustments to Appropriated Value					
a. Congressional General Reductions	-10	-505			
Adjustments to Budget Years		-495	12082	12105	
(U) Current Budget Submit/President's Budget	39355	42371	26423	26229	TBD

(U) Change Summary Explanation:

Funding: Funds were transferred from this program element to the environmental conservation program element (65853F) along with the responsibility for compliance with natural and cultural resources laws. This transfer accounts for the large change in FY 96 and following years.

Schedule: Not Applicable

Technical: Not Applicable

(U) C. Other Program Funding Summary (\$ in Thousands)

Not Applicable

(U) D. Schedule Profile

Not Applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)								DATE		February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE						PROJECT NO.			
# 6 Management Support		#0605860F Rocket Systems Launch Program						1023			
COST (\$ in Thousands)		FY 1994 Actual	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Rocket System Launch Program		16,336	23,827	5,949	6,126	6,241	6,404	6,577	6,762	LOE	LOE
<p>A. (U) <u>Mission Description and Budget Item Justification (\$ in Thousands)</u></p> <p>(U) Rocket System Launch Program (RSLP) is tasked to provide Research, Development, Test and Evaluation (RDT&E) launch vehicle support to DoD and other government agencies. RSLP was established by the Secretary of Defense in 1972. It provides mission planning, payload integration, launch support, booster storage and disposal, maintenance and logistics support for selected DoD RDT&E launches. Costs directly attributable to a specific launch or program are paid by the user (Air Force, Navy, Army, Ballistic Missile Defense Organization, etc.). RSLP directly supports deactivation of Minuteman II by providing storage of these and other assets as well as continued development of the Multiservice Launch System (MSLS). MSLS will provide a cost-effective modular front section, including guidance system, payload deck, and attitude control system, for retired Minuteman missiles. PBD 120 realigned FY 96-2001 RSLP funds from Budget Activity #4, Demonstration and Validation (PE 0603851F) and research category 6.4 to PE 0605860F, Budget Activity #6. RSLP performs research and development support operations required for general research and development use.</p> <p>(U) <u>FY 1994</u></p> <ul style="list-style-type: none"> - (U) Research test launch vehicle configuration; develop, acquire, store and maintain test launch vehicles, motors, components, and facilities in support of projected governmental user requirements. (\$5,200) - (U) Provide storage for deactivated Minutemen II missiles and other missile flight test assets. (\$6,136) - (U) Continue MSLS development. (\$5,000) <p>(U) <u>FY 1995</u></p> <ul style="list-style-type: none"> - (U) Research test launch vehicle configurations; develop, acquire, store and maintain test launch vehicles, motors, components, facilities and capabilities in support of projected governmental user requirements. (\$5,369) - (U) Provide necessary storage requirements for deactivated Minuteman II and other missile flight test assets. (\$5,458) - (U) Continue MSLS development. (\$5,500) - (U) Develop transportable launch support equipment to launch from various national and state test ranges. (\$7,500) - (U) Provide launch assets and technical assistance for all DoD RDT&E launches. (Funded by Users) <p>(U) <u>FY 1996</u></p> <ul style="list-style-type: none"> - (U) Continue storage and refurbishment of deactivated Minuteman II and other missile flight test assets. (\$5,949) <p>(U) <u>FY 1997</u></p> <ul style="list-style-type: none"> - (U) Continue storage and refurbishment of deactivated Minuteman II and other missile flight test assets. (\$6,126) 											

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

6 Management Support

#0605860F Rocket Systems Launch program

1023

B. (U) Program Change Summary (\$ in Thousands)

**Total
Cost
LOE**

1994
16,336
16,336

1995
11,827
23,827

1996
12,878

1997
11,256

Current Budget Submit/President's Budget

23.827

5,949

6.126

FOR

Change	Summary	Explanation
1. Increase in the number of employees	The number of employees has increased from 100 to 150.	This is due to the company's expansion into new markets and the hiring of additional staff to support the growth.
2. Decrease in the number of projects	The number of projects has decreased from 20 to 15.	This is due to the company's focus on completing existing projects and the cancellation of some less profitable ones.
3. Increase in the number of clients	The number of clients has increased from 50 to 75.	This is due to the company's successful marketing campaign and the acquisition of new clients.
4. Decrease in the number of suppliers	The number of suppliers has decreased from 10 to 8.	This is due to the company's consolidation of its supply chain and the elimination of some less reliable suppliers.
5. Increase in the number of products	The number of products has increased from 5 to 10.	This is due to the company's expansion into new product lines and the introduction of new products.

(U) Funding: PB FY96 - FY97 reduced for affordability to minimum required for booster storage

* FY96 funded in PE 0605860F; FY95 funded in PE 0603851F; FY94 funded in 0305119F

(U) Schedule: N/A

(U) Technical: N/A

C. (U) Other Program Funding Summary (\$ in Thousands)

1994

1995

1996

1997

1998

1999

2000

2001

To
Compl

Total Cost

Military Construction (PE 0305119F) 7,250
(for Minuteman II Storage)

Related RDT&E: PE 0605851F

7,250

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)									
BUDGET ACTIVITY					DATE				
# 6 Management Support					February 1995				
PE NUMBER AND TITLE					PROJECT NO.				
#0605860F Rocket Systems Launch Program					1023				
D. <u>Schedule Profile</u>									

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

6 - Management Support

0605896F Base Operations - RDT&E

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	109,888	105,525	117,083	124,311	125,388	127,354	126,536	139,424	Continuing	TBD
06BS Base Operating Support	65,534	59,967	67,453	73,193	72,737	73,123	70,678	81,890	Continuing	TBD
06CE Other Support	21,076	20,358	23,248	23,945	24,663	25,403	26,165	26,950	Continuing	TBD
06UT Operations Of Utilities	23,278	25,200	26,382	27,173	27,988	28,828	29,693	30,584	Continuing	TBD

Note: The following FY 94/95 funding totals represent what the totals would be considering an increase of \$26,400 in each year. Beginning in FY 96 \$26,400 is transferred to this PE from PE 0605807F (Test and Evaluation Support). (See Note 1 below.) These totals provide a more meaningful funding trend analysis for this PE.

Total PE
FY 1994 136,288
FY 1995 131,925

(1) Base Operating Support funds (\$26,400 in FY 96) were transferred from PE 0605807 (Arnold Engineering Development Center) into PE 0605896F. The purpose of the transfer is to more evenly account for BOS type efforts within PE 0605896F at the three AF major test centers. Similarly, \$26,000 has also been transferred in FY 97-01.

(U) A. **Mission Description and Budget Item Justification:** This program element provides basic, essential services of base operating support at three Air Force Materiel Command (AFMC) bases: Eglin AFB FL, Edwards AFB CA, and Arnold AFB TN. These three Air Force Bases form the core of the Air Force Test and Evaluation infrastructure to support the DoD test mission. These bases are unique national assets specifically established for test and evaluation and are funded by RDT&E appropriations. The program finances "quality of life" costs of day-to-day support for the Air Force portion of the DoD Major Range and Test Facility Bases (MRTFBs). These three locations have over 90 tenant organizations and an aggregate population in excess of 55,000 people. Civilian payroll represents approximately 41 percent of the total program, with the remainder of the program financing administrative support, security and guard services, dormitories, billeting, food services, training, utility operations, civil engineering services, transportation, and motor pools. Functions supported by this program element include comptroller, chaplain, personnel, supply, transportation and information management.

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)			DATE
BUDGET ACTIVITY			February 1995
6 - Management Support			
PE NUMBER AND TITLE			
0605896F Base Operations - RDT&E			
(U) B. <u>Program Change Summary (\$ in Thousands):</u>			
(U) Previous President's Budget	FY 1994	FY 1995	FY 1996
(U) Appropriated Value	111,350	106,914	114,961
(U) Adjustments to Appropriated Value		106,914	
a. Cong Gen Reductions		-1,389	
b. Below Threshold Reprogramming	-1,462		
(U) Adjustments to budget years since FY 95 PB			
(U) Current Budget Submit/President's Budget	109,888	105,525	117,083
			124,311
			Cont
(U) Change Summary Explanation:			
Funding: For Base Operating Support (06BS), FY 96 \$8,124 is partial offset for \$17,100 Arnold AFB BOS support realigned to this PE from PE 65807F, and FY 97 \$6,309 is partial offset for \$16,600 Arnold AFB BOS support realigned to this PE from PE 65708F. For Other Support (06CE), FY 96 \$2,955 is result of PE realignment and transfer of funds from PE 65807F to this PE to support BOS effort at Arnold AFB and offset increase costs for custodial and miscellaneous contract services, and FY 97 \$2,901 is continuing support of PE realignment and transfer of funds from PE 65807F to this PE to support BOS effort at Arnold AFB. For Operations of Utilities (06UT), FY 96 \$137 is result of PE realignment and transfer of funds from PE 65807F to this PE to support BOS effort at Arnold AFB, and FY 97 \$140 is continuing support of PE realignment and transfer of funds from PE 65897F to this PE to support BOS effort at Arnold AFB.			
Schedule: None.			
Technical: None.			
(U) C. <u>Other Program Funding Summary (\$ in Thousands):</u> Not applicable.			
(U) D. <u>Schedule Profile:</u> Not applicable.			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT

6 - Management Support

0605896F Base Operations - RDT&E

06BS

		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
06BS	Base Operating Support	65,534	59,967	67,453	73,193	72,737	73,123	70,678	81,890	Continuing	TBD

(U) **A. Mission Description and Budget Item Justification:** Finances essential base operating support which includes civilian pay, security and guard services, dormitories, billeting, food services, training, transportation and motor pools, comptroller, chaplain, supply, information management and quality of life services for the three bases.

(U) FY 1994

- (U) Financed civilian payroll. (\$35,334)
- (U) Financed mission-related travel. (\$1,300)
- (U) Financed rental and transportation costs (permanent change of stations (PCS)). (\$4,500)
- (U) Financed communications systems, tools, contract education, and equipment maintenance. (\$5,800)
- (U) Financed supplies, fuels, and miscellaneous contract services. (\$15,100)
- (U) Financed information processing and other equipment, data processing services, and on-flying support of depot-level repairables. (\$3,500)

(U) FY 1995

- (U) Financed civilian payroll. (\$35,267)
- (U) Financed mission-related travel. (\$1,300)
- (U) Financed rental and transportation costs (permanent change of stations (PCS)). (\$4,200)
- (U) Financed communications systems, tools, contract education, and equipment maintenance. (\$5,700)
- (U) Financed supplies, fuels, and miscellaneous contract services. (\$10,000)
- (U) Financed information processing and other equipment, data processing services, and on-flying support of depot-level repairables. (\$3,500)

(U) FY 1996

- (U) Financed civilian payroll. (\$35,253)
- (U) Financed mission-related travel. (\$1,700)
- (U) Financed rental and transportation costs (permanent change of stations (PCS)). (\$4,900)
- (U) Financed communications systems, tools, contract education, and equipment maintenance. (\$5,900)
- (U) Financed supplies, fuels, and miscellaneous contract services. (\$15,500)
- (U) Financed information processing and other equipment, data processing services, and on-flying support of depot-level repairables. (\$4,200)

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	PROJECT																																										
BUDGET ACTIVITY																																													
6 - Management Support		0605896F Base Operations - RDT&E	06BS																																										
<p>(U) <u>FY 1997</u></p> <ul style="list-style-type: none"> - (U) Financed civilian payroll. (\$35,793) - (U) Financed mission-related travel. (\$1,700) - (U) Financed rental and transportation costs (permanent change of stations (PCS)). (\$4,900) - (U) Financed communications systems, tools, contract education, and equipment maintenance. (\$7,500) - (U) Financed supplies, fuels, and miscellaneous contract services. (\$18,800) - (U) Financed information processing and other equipment, data processing services, and on-flying support of depot-level repairables. (\$4,500) 																																													
<p>(U) <u>B. Program Change Summary (\$ in Thousands):</u></p> <table border="1"> <thead> <tr> <th></th> <th>FY 1994</th> <th>FY 1995</th> <th>FY 1996</th> <th>FY 1997</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>(U) Previous President's Budget</td> <td>65,534</td> <td>60,839</td> <td>59,329</td> <td>66,884</td> <td>Cost</td> </tr> <tr> <td>(U) Appropriated Value</td> <td></td> <td>60,952</td> <td></td> <td></td> <td>Cont</td> </tr> <tr> <td>(U) Adjustments to Appropriated Value</td> <td></td> <td>-985</td> <td></td> <td></td> <td></td> </tr> <tr> <td> a. Cong Gen Reductions</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>(U) Adjustments to budget years since FY 95 PB</td> <td></td> <td></td> <td>8,124</td> <td>6,309</td> <td></td> </tr> <tr> <td>(U) Current Budget Submit/President's Budget</td> <td>65,534</td> <td>59,967</td> <td>67,453</td> <td>73,193</td> <td>Cont</td> </tr> </tbody> </table>					FY 1994	FY 1995	FY 1996	FY 1997	Total	(U) Previous President's Budget	65,534	60,839	59,329	66,884	Cost	(U) Appropriated Value		60,952			Cont	(U) Adjustments to Appropriated Value		-985				a. Cong Gen Reductions						(U) Adjustments to budget years since FY 95 PB			8,124	6,309		(U) Current Budget Submit/President's Budget	65,534	59,967	67,453	73,193	Cont
	FY 1994	FY 1995	FY 1996	FY 1997	Total																																								
(U) Previous President's Budget	65,534	60,839	59,329	66,884	Cost																																								
(U) Appropriated Value		60,952			Cont																																								
(U) Adjustments to Appropriated Value		-985																																											
a. Cong Gen Reductions																																													
(U) Adjustments to budget years since FY 95 PB			8,124	6,309																																									
(U) Current Budget Submit/President's Budget	65,534	59,967	67,453	73,193	Cont																																								
<p>(U) Change Summary Explanation:</p> <p>Funding: FY 96 \$8,124 is partial offset for \$17,100 Arnold AFB BOS support realigned to this PE from PE 65807F. FY 97 \$6,309 is partial offset for \$16,600 Arnold AFB BOS support realigned to this PE from PE 65708F.</p> <p>Schedule: None.</p> <p>Technical: None.</p>																																													
<p>(U) <u>C. Other Program Funding Summary (\$ in Thousands):</u> Not applicable.</p>																																													
<p>(U) <u>D. Schedule Profile:</u> Not applicable.</p>																																													

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT	
6 - Management Support		0605896F Base Operations - RDT&E								06CE	
	COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
06CE Other Support		21,076	20,358	23,248	23,945	24,663	25,403	26,165	26,950	Continuing	TBD
<p>(U) A. Mission Description and Budget Item Justification: Provides resources for fundamental civil engineering services such as custodial, fire protection, hazardous material systems certification, refuse collection, insect and pest control, rentals and leases, architectural and engineering design, grounds maintenance as well as civil engineering administrative costs, including equipment, supplies, temporary duty and civilian pay.</p> <p>(U) FY 1994</p> <ul style="list-style-type: none"> - (U) Civilian positions. (\$7,276) - (U) Mission-related travel. (\$500) - (U) Architect/engineering and other CE services. (\$4,900) - (U) Contract education, equipment maintenance and miscellaneous contract services. (\$900) - (U) Custodial service, supplies, fuels and equipment purchases. (\$7,500) <p>(U) FY 1995</p> <ul style="list-style-type: none"> - (U) Civilian positions. (\$7,158) - (U) Mission-related travel. (\$500) - (U) Architect/engineering and other CE services. (\$4,700) - (U) Contract education, equipment maintenance and miscellaneous contract services. (\$900) - (U) Custodial service, supplies, fuels and equipment purchases. (\$7,100) <p>(U) FY 1996</p> <ul style="list-style-type: none"> - (U) Civilian positions. (\$7,548) - (U) Mission-related travel. (\$500) - (U) Architect/engineering and other CE services. (\$4,900) - (U) Contract education, equipment maintenance and miscellaneous contract services. (\$1,600) - (U) Custodial service, supplies, fuels and equipment purchases. (\$8,700) 											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT.

6 - Management Support

0605896F Base Operations - RDT&E

06CE

(U) FY 1997

- (U) Civilian positions. (\$7,645)
- (U) Mission-related travel. (\$500)
- (U) Architect/engineering and other CE services. (\$4,700)
- (U) Contract education, equipment maintenance and miscellaneous contract services. (\$1,600)
- (U) Custodial service, supplies, fuels and equipment purchases. (\$9,500)

(U) B. Program Change Summary (\$ in Thousands):

	FY 1994	FY 1995	FY 1996	FY 1997	Total Cost Cont
(U) Previous President's Budget	21,076	20,595	20,473	21,044	
(U) Appropriated Value		29,632			
(U) Adjustments to Appropriated Value					
a. Cong Gen Reductions		-237			
b. Omnibus or Other Above Threshold Reprogramming		-9037			
(U) Adjustments to budget years since FY 95 PB			2,955	2,901	
(U) Current Budget Submit/President's Budget	21,076	20,358	23,428	23,945	Cont

(U) Change Summary Explanation:

Funding: FY 96 \$2,955 is result of PE realignment and transfer of funds from PE 65807F to this PE to support BOS effort at Arnold AFB and offset increase costs for custodial and miscellaneous contract services. FY 97 \$2,901 is continuing support of PE realignment and transfer of funds from PE 65807F to this PE to support BOS effort at Arnold AFB.

Schedule: None.

Technical: None.

(U) C. Other Program Funding Summary (\$ in Thousands): Not applicable.(U) D. Schedule Profile: Not applicable.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

0605896F Base Operations - RDT&E

PROJECT

06UT

6 - Management Support

COST (In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
06UT Operations Of Utilities	23,278	25,200	26,382	27,173	27,988	28,828	29,693	30,584	Continuing	TBD

(U) **A. Mission Description and Budget Item Justification:** Finances purchase of utilities (electricity, natural gas, water and sewage treatment), base operation of water and sewage treatment plants and distribution systems. Amounts of utilities consumed and waste processed for discharge exceed those of other operating bases due to unique test mission.

(U) FY 1994

- (U) Civilian positions. (\$2,100)
- (U) Purchased utilities. (\$18,778)
- (U) Travel, rentals, other CE, contract education and miscellaneous contracts. (\$200)
- (U) Equipment purchases and maintenance, supplies and materials, and fuels. (\$2,200)

(U) FY 1995

- (U) Civilian positions. (\$2,200)
- (U) Purchased utilities. (\$19,900)
- (U) Travel, rentals, other CE, contract education and miscellaneous contracts. (\$700)
- (U) Equipment purchases and maintenance, supplies and materials, and fuels. (\$2,400)

(U) FY 1996

- (U) Civilian positions. (\$2,200)
- (U) Purchased utilities. (\$20,482)
- (U) Travel, rentals, other CE, contract education and miscellaneous contracts. (\$1,200)
- (U) Equipment purchases and maintenance, supplies and materials, and fuels. (\$2,500)

(U) FY 1997

- (U) Civilian positions. (\$2,300)
- (U) Purchased utilities. (\$20,873)
- (U) Travel, rentals, other CE, contract education and miscellaneous contracts. (\$1,500)
- (U) Equipment purchases and maintenance, supplies and materials, and fuels. (\$2,500)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)					DATE	PROJECT
BUDGET ACTIVITY		PE NUMBER AND TITLE				
6 - Management Support		0605896F Base Operations - RDT&E				06UT
(U) B. <u>Program Change Summary (\$ in Thousands)</u>						
(U) Previous President's Budget	FY 1994	FY 1995	FY 1996	FY 1997	Total	
(U) Appropriated Value	24,740	25,480	26,245	27,033	Cost	
(U) Adjustments to Appropriated Value	24,740	16,443			Cont	
a. Cong Gen Reductions		-280				
b. Omnibus or Other Above Threshold Reprogramming		9037				
c. Below Threshold Reprogramming	-1462					
(U) Adjustments to budget years since FY 95 PB				140		
(U) Current Budget Submit/President's Budget	23,278	25,200	26,382	27,173	Cont	
(U) Change Summary Explanation:						
Funding: FY 96 \$137 is result of PE realignment and transfer of funds from PE 65807F to this PE to support BOS effort at Arnold AFB. FY 97 \$140 is continuing support of PE realignment and transfer of funds from PE 65897F to this PE to support BOS effort at Arnold AFB.						
Schedule: None.						
Technical: None.						
(U) C. <u>Other Program Funding Summary (\$ in Thousands):</u> Not applicable.						
(U) D. <u>Schedule Profile:</u> Not applicable.						

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE
BUDGET ACTIVITY										
7, Operational Systems Development										
PE NUMBER AND TITLE										
0702207F, Depot Maintenance										
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	1792	2032	1464	1495	1567	1618	1668	1720	Continue	TBD
3326, Precision Measurement & Calibration Equipment Development (PMCED)	1792	2032	1464	1495	1567	1618	1668	1720	Continue	TBD

A. Mission Description and Budget Item Justification
 This program develops, tests, and evaluates national and Air Force measurement standards and calibration equipment in support of all Air Force programs and activities including over 150 base Precision Measurement Equipment Laboratories (PMELEs) worldwide. The technology of modern weapons systems require continuing research and development of calibration equipment to ensure aerospace equipment meets Air Force readiness objectives. Work for this program is performed under Budget Activity 7 and research categories 6.1 Basic Research, 6.2 Exploratory Development, 6.3A Advanced Development, 6.3B Demonstration/Validation, 6.4 Engineering and Manufacturing Development, 6.5 Management Support, and 6.6 Operational Systems Development. Metrology research provides technology to support systems in all phases of development and acquisition, as well as R&D lab efforts, test ranges, and operational weapon systems support.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE									
BUDGET ACTIVITY										PE NUMBER AND TITLE									
7, Operational Systems Development										0702207F, Depot Maintenance									
B. <u>Program Change Summary (\$ in Thousands)</u>																			
Previous President's Budget										1994	1995	1996	1997	Total Cost					
Appropriated Value										1820	2099	1472	1503	6894					
Adjustments to Appropriated Value:										1830									
a) Congressional General Reduction										-10	-23								
b) SBIR										-28	-44								
c) Non-pay purchases inflation																			
Current Budget Submit/President's Budget										1792	2032	1464	-8 1495	6827					
Change Summary Explanation: None																			
C. <u>Other Program Funding Summary (\$ in Thousands)</u>																			
Aircraft Procurement, BA5, Modifications										1994	1995	1996	1997	1998	1999	2000	2001	To Compl	Total Cost
Aircraft Procurement, BA7, Common Support Equipment,										2462	18482	9082	17483	5739	4431	4217	4106	N/A	N/A
Aircraft Procurement, BA6, Spares and Repair Parts										3	2171	1	1	1	1	1	1	N/A	N/A
O&M, Air Force										110	165	283	507	773	10603	10921	11249	N/A	N/A
Military Personnel, Air Force										241240	154523	136353	141182	143122	146836	151012	155262	N/A	N/A
										32616	30982	24826	24383	25014	25523	25931	26445	N/A	N/A
<u>Related activities:</u> Not applicable																			
D. <u>Schedule Profile:</u> Not applicable																			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY								DATE	PROJECT NO.	
7, Operational Systems Development								0702207F, Depot Maintenance		
PE NUMBER AND TITLE								3326		
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Precision Measurement & Calibration Equipment Development (PMCED)	1792	2032	1464	1495	1567	1618	1668	1720	Continue	TBD
<p>A. <u>Mission Description and Budget Item Justification</u></p> <p>(U) Designed to develop, test, and evaluate standards and associated equipment used in the measurement and calibration of advanced weapons systems and support equipment. Includes such high technology as lasers, microwave, millimeter wave, electro-optical, and automated test equipment. Work supports critical metrology and calibration requirements throughout the Air Force and the overall advancement of national measurement standards and technology.</p> <p>(U) FY 1994</p> <ul style="list-style-type: none"> - (U) Completed development of error correction software; continued development of new photometric standards and high brightness IR source in support of electro-optical weapon systems. (\$120K) - (U) Continued development of IR reflectance standards and IR and laser detector standards for infrared / laser weapon systems. (\$641K) - (U) Developed prototype calibration standard for coordinate measuring machines (CMMs). (\$181K) - (U) Continued improvements in measurement capabilities (noise figure, impedance, and phase noise) to support low radar observables and improve quality and reliability of radar and communication systems. (\$355K) - (U) Continued development of resistance, voltage, high frequency and electrical pulse standards to support high accuracy test equipment. (\$355K) - (U) Completed fabrication of prototype supershaker in support of propulsion system vibration monitoring instrumentation. (\$100K) - (U) Completed analysis of beta surface measurement problems required to develop measurement support of radiation hazard instruments. (\$40K) <p>(U) FY 1995</p> <ul style="list-style-type: none"> - (U) Complete development of IR reflectance standards; continue development of IR transmittance and laser detector standards for IR / laser weapon systems. (\$530K) - (U) Complete development of improved IR source; continue development of improved IR & photometric detector standards for electro-optical weapon systems. (\$390K) - (U) Complete development of measurement capabilities to support low radar observables and continue development of standards for radar and communications systems. (\$300K) 										

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	FEBRUARY 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
7, Operational Systems Development	0702207F, Depot Maintenance	3326	
<p>(U) FY 1995 (cont)</p> <ul style="list-style-type: none"> - (U) Continue development of efficient calibration methodologies for CMMs used for measurement of precision aircraft components/fixtures. (\$326K) - (U) Continue development of microwave noise figure standards used to support radar and communication receivers. (\$240) - (U) Continue development work to support radiation hazard instrumentation. (\$60K) - (U) Continue development of power standards for RF communication and radar systems. (\$85K) - (U) Continue model development to improve electrical standards accuracy and reliability for precision measurement equipment. (\$145K) <p>(U) FY 1996</p> <ul style="list-style-type: none"> - (U) Initiate development of dimensional standards to support high performance aircraft joints and fasteners. (\$82K) - (U) Continue development of improved electro-optical standards to support low observables and weapon tracking systems. (\$675K) - (U) Continue development of efficient calibration methodologies for CMMs used in calibration support equipment. (\$150K) - (U) Continue development of standards and measurements for radar support instruments to provide traceability to DoD. (\$250K) - (U) Continue development work to support radiation hazard instrumentation. (\$80K) - (U) Continue development of power standards for RF communication and radar systems. (\$120K) - (U) Continue model development to improve electrical standards accuracy and reliability. (\$115K) <p>(U) FY 1997</p> <ul style="list-style-type: none"> - (U) Complete development work to support radiation hazard instrumentation. (\$83K) - (U) Continue development of improved electro-optical standards to support low observables and weapon tracking systems. (\$700K) - (U) Continue development of efficient methodologies for CMMs used in calibration support equipment. (\$200K) - (U) Continue development of standards and measurements for radar support instrumentation to provide traceability to DoD. (\$250K) - (U) Continue development of power standards for RF communication and radar systems. (\$150K) - (U) Continue model development to improve electrical standards accuracy and reliability. (\$120K) 			

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE

FEBRUARY 1995

PROJECT NO.

7, Operational Systems Development

0702207F, Depot Maintenance

3326

A. Project Cost Breakdown (\$ in Thousands)

	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>
Development Measurement Standards and Calibration Support	1748	1968	1444	1475
Travel	16	20	20	20
SBIR	28	44		
Total	1792	2032	1464	1495

B. Budget Acquisition History and Planning Information (\$ in Thousands)

Performing Organizations:

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to 1994	Budget 1994	Budget 1995	Budget 1996	Budget 1997	Budget to Complete	Total Program
<u>Product Development Organizations</u>											
National Institute of Standards Technology AGMC	Funds Transfer (SF 1080) In house	1st QTR N/A	TBD	TBD	5816 41	1776 16	2012 20	1444 20	1475 20	Continue	TBD
<u>Government Furnished Property: Not Applicable</u>											
Subtotal Product Development											
Total Project					5857	1792	2032	1464	1495	Continue	TBD

C. Funding Profile (\$ in Thousands): Not applicable

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE
BUDGET ACTIVITY										February 1995
PE NUMBER AND TITLE										
#7 Operational Systems Development										
0708012F Logisitic Support Activities										
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	6,203	5,742	*	*	*	*	*	*	Continuing	TBD
3090, Embedded Computer Resources Support Improvement Program	4,909	4,523	*	*	*	*	*	*	Continuing	TBD
3317, Air Force Digital Specifications and Standards	1,294	1,219	*	*	*	*	*	*	Continuing	TBD
<p>A. <u>Mission Description and Budget Item Justification</u></p> <p>(U) BRIEF DESCRIPTION OF ELEMENT: This program funds the growing need for research and development of support issues related to the increasing reliance on computer resources. New software design techniques, software support tools, environments, and processes; and standards or digital documentation will result from this program. Functions formerly accomplished in hardware have been assumed by software, and software which can be changed to meet new and different threats and missions is critical to the ability of the Air Force to be responsive to world situations. Project 3090 conducts research to improve support of embedded computer system software. It encompasses automation and standardization of support processes, advanced support methodologies, tools and environments, and readiness support to facilitate rapid turnaround of software in response to changing mission and/or changing threat requirements. Project 3317 conducts research leading to the development and updating of digital standards. These standards are required to implement the Continuous Acquisition and Life-cycle Support (CALS) concept.</p>										
* Funds were transferred into PE 0708611F starting in FY96 from PE 0708012F										

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE																		
BUDGET ACTIVITY	PE NUMBER AND TITLE																			
#7 Operational Systems Development	0708012F Logistic Support Activities	February 1995																		
<p>B. Program Change Summary (\$ in Thousands)</p> <table> <tr> <td>Previous President's Budget Appropriated Value</td> <td>1994 6,301</td> <td>1995 5,804</td> <td>1996 *</td> <td>1997 *</td> <td>Total Cost TBD</td> </tr> <tr> <td>Adjustments to Appropriated Value</td> <td>-98</td> <td>-62</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Current Budget Submit/President's Budget</td> <td>6,203</td> <td>5,742</td> <td>*</td> <td>*</td> <td>TBD</td> </tr> </table> <p>Change Summary Explanation: Funding: *Funds were transferred into PE 070861F starting in FY96 from PE 0708012F</p> <p>Schedule: Not Applicable Technical: Not Applicable</p>			Previous President's Budget Appropriated Value	1994 6,301	1995 5,804	1996 *	1997 *	Total Cost TBD	Adjustments to Appropriated Value	-98	-62				Current Budget Submit/President's Budget	6,203	5,742	*	*	TBD
Previous President's Budget Appropriated Value	1994 6,301	1995 5,804	1996 *	1997 *	Total Cost TBD															
Adjustments to Appropriated Value	-98	-62																		
Current Budget Submit/President's Budget	6,203	5,742	*	*	TBD															
<p>C. Other Program Funding Summary (\$ in Thousands)</p> <p>Not Applicable</p>																				
<p>D. Schedule Profile</p> <p>Not Applicable</p>																				

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#7 Operational Systems Development		0708012F Logistic Support Activities								3090	
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Embedded Computer Resources Support Improvement Program (ESIP)	4,909	4,523	*	*	*	*	*	*	Continuing	TBD	
<p>A. Mission Description and Budget Item Justification</p> <p>Project 2522, Embedded Computer Resources Support Improvement Program (ESIP): Conducts research to improve support of embedded computer system software. It encompasses automation and standardization of support processes, advanced support methodologies, tools and environments, and readiness support to facilitate rapid turnaround of software in response to changing mission and/or changing threat requirements.</p> <p>(U) <u>FY 1994</u></p> <ul style="list-style-type: none"> (U) Began advanced avionics instrumentation and sensor control capability for capturing software anomalies in flight (12K). (U) Test data instrumentation collection prototype on F-15 test aircraft (625K). (U) Demonstrated avionics visualization concepts to improve data analysis to identify and correct anomalies (704K). (U) Continued development of prototype virtual simulator (2096K). (U) Preliminary work to use hypermedia on technical manuals (500K). (U) Demonstrated automated verification and validation test case generation and begin evaluation within an ASE (1070K). <p>(U) <u>FY 1995</u></p> <ul style="list-style-type: none"> (U) Demonstrate hypermedia-based Integrated Product Development (IPD) (400K). (U) Complete adaptive software support study (145K). (U) Demonstrate virtual node software (350K). (U) Develop prototype capability for quick/detailed analysis of data from different avionics sources (700K). (U) Define system monitor and interactive processor architecture for advanced avionics instrumentation (700K). (U) Demonstrate virtual simulator concept (2290K). <p>(U) <u>FY 1996 Not Applicable</u></p> <p>(U) <u>FY 1997 Not Applicable</u></p> <p>*Funds were transferred into PE 0708611F starting in FY 96 from PE 0708012F</p>											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT NO.	
#7 Operational Systems Development		0708012F Logistic Support Activities								3317	
COST (\$ In Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Air Force Digital Specifications and Standards	1,294	1,219	*	*	*	*	*	*	Continuing	TBD	
<p>A. Mission Description and Budget Item Justification</p> <p>This project conducts research leading to the development and updating of digital standards. These standards are required to implement the Continuous Acquisition and Life Cycle Support (CALS) concept.</p> <p>(U) <u>FY 1994</u></p> <ul style="list-style-type: none"> - (U) Published final MIL-HDBK 59B (40K) (1st Qtr). - (U) Supported development of document type definitions under technical manual specifications and standards (370K). - (U) Supported development of format output specification standards development (556K). - (U) Surveyed need for Product Data/engineering drawings (85K). - (U) Examined process improvement opportunities from Product Data acquisition (85K). - (U) Represented AF needs at national and international standards activities (158K). <p>(U) <u>FY 1995</u></p> <ul style="list-style-type: none"> - (U) Continue developing and testing document type definitions and formatting output specifications instances for JCALS IOT&E (500K) (3rd Qtr). - (U) Develop and test specifications and standards in support of Product Data Systems Modernization (PDSM) implementation (637K). - (U) Represent AF needs at national and international standards activities (82K). <p>* (U) <u>FY 1996</u> Not Applicable</p> <p>* (U) <u>FY 1997</u> Not Applicable</p> <p>* Funds were transferred into PE 0708611F starting in FY96 from PE 0708012F</p>											

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	PROJECT NO.												
BUDGET ACTIVITY	PE NUMBER AND TITLE														
#7 Operational Systems Development	0708012F Logistic Support Activities		3317												
<p>B. <u>Program Change Summary (\$ in Thousands)</u></p> <table border="0"> <tr> <td>Previous President's Budget Appropriated Value Adjustments to Appropriated Value</td> <td>1994 1,294</td> <td>1995 1,219</td> <td>1996 *</td> <td>1997 *</td> <td>Total Cost TBD</td> </tr> <tr> <td>Current Budget Submit/President's Budget</td> <td>1,294</td> <td>1,219</td> <td>*</td> <td>*</td> <td>TBD</td> </tr> </table> <p>Change Summary Explanation: Funding: * Funds were transferred into PE 0708611F starting in FY96 from PE 0708012F</p> <p>Schedule: Not Applicable</p> <p>Technical: Not Applicable</p>				Previous President's Budget Appropriated Value Adjustments to Appropriated Value	1994 1,294	1995 1,219	1996 *	1997 *	Total Cost TBD	Current Budget Submit/President's Budget	1,294	1,219	*	*	TBD
Previous President's Budget Appropriated Value Adjustments to Appropriated Value	1994 1,294	1995 1,219	1996 *	1997 *	Total Cost TBD										
Current Budget Submit/President's Budget	1,294	1,219	*	*	TBD										
<p>C. <u>Other Program Funding Summary (\$ in Thousands)</u></p> <p>Not Applicable</p>															
<p>D. <u>Schedule Profile</u></p> <p>Not Applicable</p>															

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE February 1995

BUDGET ACTIVITY		PE NUMBER AND TITLE								
#7 Operational Systems Development		0708026F Productivity, Reliability, Availability, Maintainability (PRAM)								
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost ¹	36,380	15,467	15,719	15,340	16,019	16,784	17,288	17,805	Continuing	Continuing
2146, Productivity, Reliability, Availability, Maintainability (PRAM)	17,946	6,732	15,719	15,340	16,019	16,784	17,288	17,805	Continuing	Continuing
3263, Reliability and Maintainability Technology Insertion Program (RAMTIP) ¹	18,434	8,735	0	0	0	0	0	0	Not Applicable	Not Applicable

1 - RAMTIP FY 95 and prior years funded in PE 0604609F.

A. Mission Description and Budget Item Justification

This descriptive summary combines two separate AF Reliability and Maintainability technology initiatives, formerly PRAM and RAMTIP. PRAM addresses acute R&M deficiencies by funding prototypes of mature, commercial off-the-shelf technologies that can be incorporated into existing AF weapon systems and subsystems. RAMTIP addresses R&M needs by developing state-of-the-art new technologies that can be readily incorporated into AF weapon systems. The objective of this program is to emphasize the rapid incorporation of R&M technology "fixes" that will improve the operational capability of weapon systems and equipment at a significantly lower cost. The impetus to combine PRAM and RAMTIP into a single program reflects an increasing emphasis on PRAM-related projects to address a greater number of R&M problems. Beginning in FY 96, RAMTIP efforts will terminate and any ongoing work will transition to PRAM. Average project length is twenty-seven months. This will constitute one of the most cost effective programs within the Air Force, with a proven return on investment averaging 16:1. PRAM, a level-of-effort program, is dependent upon MAJCOMS and field support to adapt technology once the initial investment is completed. Listed below are projects being pursued as identified by the Air Force Materiel Command (AFMC) Technology Master Process (TMP). The objective of the TMP is to strategically focus technology application/insertion for the Air Force's future needs. A periodic review for all projects is held to ascertain the opportunity for success of those currently underway and to select new projects. The category of research being performed in this PE is Operational Systems Development because projects are being engineered for already operational weapon systems.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE February 1995

BUDGET ACTIVITY

#7 Operational Systems Development

PE NUMBER AND TITLE

0708026F Productivity, Reliability, Availability, Maintainability (PRAM)

B. Program Change Summary (\$ in Thousands)

	1994	1995	1996	1997	Total Cost Continuing
Previous President's Budget	36,761	15,589	15,809	15,428	
Appropriated Value	36,761	15,589			
Adjustments to Appropriated Value					
a. Small Business Innovative Research (SBIR) - PRAM	-282				
b. SBIR - RAMTIP	-214				
c. Transfer of funds from PE 064704F, Common Support Equipment - PRAM	160				
d. Unknown reduction (RAMTIP)	-45				
e. Undistributed Congressional University Research Reductions		-3			
f. Non-FFRDC General Reduction		-119			
g. Non-Pay Purchases Inflation (PRAM)			-90	-88	
Current Budget Submit/President's Budget	36,380	15,467	15,719	15,340	Continuing

Change Summary Explanation:

Funding: RAMTIP FY 95 and prior years funded within PE 0604609F. Amount shown here represents sum of funding formerly within PE 0604609F and PE 0708026F. Beginning in FY 96, all RAMTIP funds in PE 0604609F will transfer to PE 0708026F and all RAMTIP efforts will terminate with any ongoing efforts absorbed into PRAM

Schedule: None

Technical: None ;

C. Other Program Funding Summary (\$ in Thousands) Not applicableD. Schedule Profile Not applicable

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE February 1995

BUDGET ACTIVITY		PE NUMBER AND TITLE							PROJECT NO.	
#7 Operational Systems Development		0708026F Productivity, Reliability, Availability, Maintainability (PRAM) 2146							2146	
CO&ST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
2146, Productivity, Reliability, Availability, Maintainability (PRAM)	17,946	6,732	15,719	15,340	16,019	16,784	17,288	17,805	Continuing	Continuing

A. Mission Description and Budget Item Justification Initiated in 1975 by the Chief of Staff to reduce current and potential operations and support costs; and to improve the effectiveness of Air Force operational systems, subsystems and equipment by providing "front end" investments for the adaptation and prototyping of commercial-off-the-shelf technology. The efforts described below represent a "snapshot" of ongoing efforts and may be subject to change due to evolving R&M priorities.

(U) FY 1994

- (U) Completed work on the C-130 Air Refueling Improvement. (\$0.210M)
- (U) Began development, modification, prototype and test for Structural Efficiency of Fighter Aircraft Doors. (\$0.700M).
- (U) Completed Preliminary Design Review for a more reliable, rugged, man-portable Mini-Zone Marker. (\$0.700M)
- (U) Initiated development of Cryogenic Foil-Bearing Turbopump and Portable Line Replaceable Unit (LRU) Cannot Duplicate Test System. (\$0.550M)
- (U) Started test and manufacturing for Fatigue Resistant Bulkheads. (\$1.720M).
- (U) Completed inlet rain erosion tape project. (\$0.130M)
- (U) Completed the integrated product development acquisition tools project. (\$0.533M)
- (U) Started the reusable software for spacecraft project. (\$0.530M)
- (U) Started the advanced magnetic azimuth detector, a form-fit-function replacement for the current magnetic azimuth detector fitted to the KC-135, C-130, F-15, and the B-1B. A ten-fold increase in reliability is expected. (\$1.100M)
- (U) Performed the PDR, CDR, and complete the design on the compressor blade monitor system. (\$0.495M)
- (U) Incremental funding will be provided for the continuation of activities begun in prior years. (\$10.919M)
- (U) Completed High Load Bearing Surface Enhancement Program, already approved for implementation at Ellsworth AFB, SD. (\$0.025M)
- (U) Completed Over Wing Fairing Seal Refurbishment and repair. (\$0.157M).
- (U) Completed Mini Arch Evaluation (\$0.025M)
- (U) Completed Multiphase Vacuum Packed Liferails (\$0.130M)
- (U) Completed Inductive Proximity Switch. (\$0.022M)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#7 Operational Systems Development	0708026F Productivity, Reliability, Availability, Maintainability (PRAM)	2146	
A. Mission Description and Budget Item Justification (Continued)			
(U) FY 1995			
- (U)	Complete work on B-1B Oxygen Analyzer, Low cost Titanium Casting, Automated Vehicle Data Acquisition, Miniature RF Blind-mated Connector, Repair Technologies for CRT High Voltage Power Supply, Electronic Board and Tester Simulation Software, Fatigue Resistant Bulkheads, Compressor Blade Monitor, Mini Zone Marker, Improved Fighter Aircraft Doors, and Combustor Rework Cell. (\$3.800M)		
- (U)	Continue incremental funding on Nickel-hydrogen Battery, and Reusable Software for Spacecraft. (\$0.600M)		
- (U)	Given funding required for continuation of on-going projects and reduced level of funding, there will be a minimal amount set aside for Quick Reaction Projects. (\$0.785M)		
- (U)	Start Fiber Optic Attitude Sensor. (\$1.547M)		
(U) FY 1996			
- (U)	Continue incremental funding on Nickel-hydrogen Battery, Reusable Software for Spacecraft and Fiber Optic Attitude Sensor. (\$0.850M)		
- (U)	Flight Test Digital Map System in F-15. (\$4.100M)		
- (U)	Complete testing of Modular Mission Computer in the F-16 (\$0.350)		
- (U)	Complete work on Advanced Hybrid Oxygen System (\$1.050M)		
- (U)	Complete work on Fiber Optic Rate Gyro (\$0.600M)		
- (U)	Complete work on Laser Ultrasonic Inspection System (\$0.439M)		
- (U)	The AFMC Technology Master Process (TMP) will be used to review needs and level of funding during 2nd Qtr FY95 to consider future projects. The TMP and the Quick Reaction Team will identify potential projects with the highest payback in terms of operational capability, reliability and maintainability improvement, and cost for execution. (\$8.330M)		
(U) FY 1997			
- (U)	Complete activity on Nickel-hydrogen Battery and Reusable Software for Spacecraft. (\$0.550M)		
- (U)	The TMP will review needs and funding during 2nd Qtr FY96 to consider future projects. The TMP will identify potential projects with the highest payback in terms of operational capability, reliability and maintainability improvement, and cost for execution. (\$14.790M)		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)DATE **February 1995**

BUDGET ACTIVITY	PE NUMBER AND TITLE				PROJECT NO.
#7 Operational Systems Development	0708026F Productivity, Reliability, Availability, Maintainability (PRAM)				2146

B. Program Change Summary (\$ in Thousands)

	1994	1995	1996	1997	Total Cost
Previous President's Budget	18,068	6,785	6,881	6,705	Continuing
Appropriated Value	18,068	6,785			
Adjustments to Appropriated Value					
a. Small Business Innovative Research (SBIR)	-282				
b. Transfer from PE 064709F	160				
c. PRAM-RAMTIP Consolidation					
d. Undistributed Congressional University Research Reductions		-1	8928	8723	
e. Non-FFRDC General Reduction		-52			
f. Non-Pay Purchases Inflation			-90	-88	
Current Budget Submit/President's Budget	17,946	6,732	15,719	15,340	Continuing
Change Summary Explanation:					
Funding: FY 95 funding reflects Congressional and AF reductions. FY 96 and FY 97 funding reflect transfer of funds from PE 0604609F, RAMTIP, and inflation adjustments.					

Schedule: None

Technical: None

C. Other Program Funding Summary (\$ in Thousands) Not applicable.**Related Activities:**

- PRAM works in a complimentary role with the Fastener, Actuator, Connectors, Tools, and Subsystems (FACTS) program, PE 0708004F, and the Aircraft Engine Component Improvement Program (CIP), PE 0604268F as it relates to reliability and maintainability improvements in operational engines.
- All PRAM projects are closely coordinated with the AF Laboratories to preclude duplication of effort and to take advantage of technology advances emanating from the laboratory environment.
- All PRAM projects are reviewed for potential Army/Navy interest, and dialogue established in cases where commonality of problems exist such that solutions become DoD-wide.
- There is no duplication of effort within the Air Force or the Department of Defense.

D. Schedule Profile Not applicable.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE February 1995

BUDGET ACTIVITY		PE NUMBER AND TITLE						PROJECT NO.	
#7 Operational Systems Development		0708026F Productivity, Reliability, Availability, Maintainability (PRAM) 3263						3263	
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Total Cost
3263, Reliability and Maintainability Technology Insertion Program (RAMTIP)	18,434	8,735	0	0	0	0	0	0	Not Applicable

A. Mission Description and Budget Item Justification Originally established to complement PRAM, to accelerate development and transition of emerging, high-leverage technologies from the laboratory to the implementation phase. The efforts described below represent a "snapshot" of ongoing efforts and may be subject to change due to evolving R&M priorities.

(U) FY 1994

- (U) Critical Design Review for Digital Map System and laser ultrasonic inspection system. (\$7.136M)
- (U) Conducted feasibility study for Ada compiler modifications, improving maintenance of F-16 MMC through real-time monitorability improvements. (\$1.543M)
- (U) Completed qualification and pre-flight test review of advanced maintenance-free aircraft battery for E-8, F-22, B-52 and others. Anticipate substantial increase for MTBF. (\$1.400M)
- (U) Began full-scale testing of thin dense chrome bearings to reduce corrosion and increase endurance in engines on F-16, B1-B, KC-135, and others. (\$1.300M)
- (U) Installed electric actuators on C-141 to replace central hydraulic system on cargo aircraft including C-5 and KC-135. (\$4.400M)
- (U) Began fabrication of modular, miniature, fiber-optic, rate gyroscope for use in multiple Air Force systems with a MTBF improvement of 9:1. (\$0.700M)
- (U) Continued work on universal water activated release system, advanced fiber optic connector, erosion-resistant coating for IR windows, random agile de-interleave and laser automated decoating system. (\$1.955M)

(U) FY 1995

- (U) Flight test electric actuators on C-141 and install/ground-test Digital Map System. (\$5.000M)
- (U) Deliver prototype Ada compiler for monitorability of F-16-MMC. (\$1.350M)
- (U) Complete thin dense chrome bearings, erosion resistant infra-red windows and laser ultrasonic inspection system projects. (\$1.185M)
- (U) Fabricate and field test miniature, fiber-optic, rate gyro. (\$1.200M)
- (U) Given funding required for continuation of on-going projects and reduced level of funding, there will not be any new projects initiated during FY95.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

#7 Operational Systems Development 0708026F Productivity, Reliability, Availability, Maintainability (PRAM) 3263 PROJECT NO.

A. Mission Description and Budget Item Justification (Continued)

- (U) FY 1996
- (U) RAMTIP efforts terminate in FY 1996.
- (U) FY 1997
- (U) RAMTIP efforts terminate in FY 1996.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)DATE **February 1995**

BUDGET ACTIVITY	PE NUMBER AND TITLE		PROJECT NO.	
#7 Operational Systems Development	0708026F Productivity, Reliability, Availability, Maintainability (PRAM) 3263			

B. Program Change Summary (\$ in Thousands)

	1994	1995	1996	1997	Total Cost Continuing
Previous President's Budget	18,693	8,804	8,928	8,723	
Appropriated Value	18,693				
Adjustments to Appropriated Value					
a. Small Business Innovative Research	-214				
b. Unknown Reduction	-45				
c. PRAM-RAMTIP Consolidation			-8928	-8723	
d. Undistributed Congressional University Research Reductions		-2			
e. Non-FFRDC General Reduction		-67			
Current Budget Submit/President's Budget	18,434	8,735	0	0	Not Applicable
Change Summary Explanation:					
Funding: FY 95 funding reflects Congressional and AF reductions. RAMTIP efforts terminate in FY 96. FY 96 and out funding will transfer to PE 0708026F, PRAM.					

Schedule: None

Technical: None

C. Other Program Funding Summary (\$ in Thousands) Not applicable.**Related Activities:**

- RAMTIP works in a complimentary role with the PRAM program, PE 0708026F.
- All RAMTIP projects are closely coordinated with the AF Laboratories to preclude duplication of effort and to take advantage of technology advances emanating from the laboratory environment.
- All RAMTIP projects are reviewed for potential Army/Navy interest, and dialogue established in cases where commonality of problems exist such that solutions become DoD-wide.
- There is no duplication of effort within the Air Force or the Department of Defense.

D. Schedule Profile Not applicable

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE	February 1995
BUDGET ACTIVITY										PE NUMBER AND TITLE	
#7 Operational Systems Development										0708611F, Support Systems Development	
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
Total Program Element (PE) Cost	9,383 ⁴	8,874 ⁴	5,906	5,662	5,875	6,093	6,268	6,462	Continuing	Continuing	
3090, Embedded Computer Resources Support Improvement Program (ESIP)	4,909 ¹	4,523 ¹	3,268	3,117	3,332	3,575	3,682	3,800	Continuing	Continuing	
3318, Product Data Systems Modernization (PDSM)	3,734 ²	3,688 ²	2,149	2,068	2,037	1,978	2,033	2,095	Continuing	Continuing	
3759, Air Force Support Equipment Management (AFSEM)	740 ³	663 ³	489	477	506	540	553	567	Continuing	Continuing	
<p>A. Mission Description and Budget Item Justification</p> <p>(U) This program element (PE) improves support of embedded computer system software, automates and standardizes weapon system support processes, establishes advanced support methodologies, provides automated tools and infrastructure environments, and improves readiness support to facilitate rapid software turnaround in response to changing mission and/or threat requirements. It conducts research and development to update Air Force digital data standards to commercial industry standards that support the Continuous Acquisition and Life-Cycle Support (CALS) concept. This program element also supports the Air Force support equipment (SE) management objective to develop, support, distribute, and maintain products that improve Air Force SE acquisition. It supports the Air Force Automatic Test Systems (ATS) Product Master Plan and Air Force ATS Database to identify and evaluate all Air Force ATS for both long and short-term planning. The category of research being performed in this PE is Operational Systems Development because projects are being engineered to support already operational weapon systems.</p> <p>¹ FY 94 and FY 95 efforts funded within PE 0708012F, Project 3090, Embedded Computer Resources Support Improvement Program.</p> <p>² FY 94 and FY 95 efforts funded within PE 0708012F, Project 3317, Air Force Digital Specifications and Standards, and PE 0604740F, Project 3315, Digital Information Technology Transition. Amount shown represents sum of both PEs.</p> <p>³ FY 94 and FY 95 efforts funded within PE 0604704F, Project 3759, Air Force Support Equipment Management.</p> <p>⁴ Amount shown represents sum of funds from PEs listed in notes 1-3 above. Funding transfers to this PE starting in FY 96.</p>											

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE _____

February 1995

BUDGET ACTIVITY

#7 Operational Systems Development

PE NUMBER AND TITLE

0708611F, Support Systems Development

B. Program Change Summary (\$ in Thousands)

	<u>1994*</u>	<u>1995*</u>	<u>1996</u>	<u>1997</u>	Total <u>Cost</u> Continuing
Previous President's Budget					
Appropriated Value	9,481	9,166	6,855	6,545	
Adjustments to Appropriated Value		9,166			
a. FY 94 Actuals	-98				
b. Congressional General Reductions		-179			
c. Small Business Innovative Research (SBIR)		-113			
d. Air Force & Defense Wide Com			-879	-824	
e. Defense Standardization Program			-36	-28	
f. Non-Pay Purchases Inflation			-34	-31	

Current Budget Submit/President's Budget

Change Summary Explanation:

Funding: * Funds were transferred into PE 0708611F starting in FY96 from PE 0708012F for Project 3090, Embedded Computer Resources Support Improvement Program and Project 3318, Product Data Systems Modernization, PE 0604704F for Project 3759, Air Force Support Equipment Management, and PE 0604740 for Project 3318, Product Data Systems Modernization. FY 96 and FY 97 reductions based on inflation adjustments and AF reductions to fund higher priority programs.

Schedule: Not Applicable

Technical: Not Applicable

C. Other Program Funding Summary (\$ in Thousands)

	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>To</u>	<u>Total</u>
O&M (Project 3090, ESIP)	0*	0*	15,043	18,283	19,557	15,662	16,188	16,721	Complete	Cost
Other Proc (Project 3090, ESIP)	3,282*	2,542*	1,789	2,289	2,345	2,435	2,508	2,584	Continuing	Continuing

* FY 94 and FY 95 efforts funded within PE 0708012F, Project 3090, Embedded Computer Resources Support Improvement Program.

D. Schedule Profile: See individual projects.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY										DATE	PROJECT NO.
#7 Operational Systems Development										February 1995	3090
PE NUMBER AND TITLE											
0708611F, Support Systems Development											
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
3090, Embedded Computer Resources Support Improvement Program (ESIP)	4,909*	4,523*	3,268	3,117	3,332	3,575	3,682	3,800	Continuing	Continuing	
<p>A. Mission Description and Budget Item Justification</p> <p>(U) This project conducts research to improve support of embedded computer system software. It encompasses automation and standardization of support processes, advanced support methodologies, tools and environments, and readiness support to facilitate rapid turnaround of software in response to changing mission and/or changing threat requirements. The category of research being performed in this PE is Operational Systems Development because projects are being engineered to support already operational weapon systems.</p> <p>(U) <u>FY 1994 (\$ in Thousands)*</u></p> <ul style="list-style-type: none"> - (U) Began advanced avionics instrumentation and sensor control capability for capturing software anomalies in flight (\$12). - (U) Test data instrumentation collection prototype on F-15 test aircraft (\$625). - (U) Demonstrated avionics visualization concepts to improve data analysis to identify and correct anomalies (\$704). - (U) Continued development of prototype virtual simulator (\$2,096). - (U) Preliminary work to use hypermedia on technical manuals (\$500). - (U) Demonstrated automated verification and validation test case generation and begin evaluation (972). <p>(U) <u>FY 1995 (\$ in Thousands)*</u></p> <ul style="list-style-type: none"> - (U) Demonstrate hypermedia-based Integrated Product Development (IPD) (\$400). - (U) Complete adaptive software support study (\$145). - (U) Demonstrate virtual node software (\$350). - (U) Develop prototype capability for quick/detailed analysis of data from different avionics sources (\$700). - (U) Define system monitor and interactive processor architecture for advanced avionics instrumentation (\$700). - (U) Demonstrate virtual simulator concept (\$2,228). <p>* FY 94 and FY 95 efforts funded within PE 0708012F, Project 3090, Embedded Computer Resources Support Improvement Program. Funds transfer into PE 0708611F starting in FY 96.</p>											

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#7 Operational Systems Development	0708611F, Support Systems Development	3090	
<p>(U) <u>EY 1996 (\$ in Thousands)</u></p> <ul style="list-style-type: none"> - (U) Demonstrate real-time fault tolerant software techniques (\$200). - (U) Demonstrate virtual hypermedia-based support environment (\$390). - (U) Demonstrate automated testing for displays (\$598). - (U) Develop virtual simulator module switching unit (\$825). - (U) Transition Radio Frequency (RF) testing techniques to Air Logistics Centers (ALCs) (\$350). - (U) Test and demonstrate data analysis prototype and techniques (\$540). - (U) Continuation of A Broad Based Environment for Test (ABBET) commercial off-the-shelf (COTS) tools evaluation and interface standardization development (\$365)* <p>(U) <u>EY 1997 (\$ in Thousands)</u></p> <ul style="list-style-type: none"> - (U) Test and demonstrate virtual simulator module switching unit (\$745). - (U) Demonstrate prototype capability for adaptive interactive instrumentation of advanced avionics systems (\$616). - (U) Transition data analysis/data visualization system and techniques to ALCs (\$195). - (U) Initiate reconfiguration of real-time software capability for dynamic adaptation of avionics to environment for fault tolerance (\$494). - (U) Demonstrate advanced automatic verification and validation testing with displays (\$640). - (U) Continuation of ABBET COTS tools evaluation and interface standardization development (\$427)* <p>* ABBET tasks continue efforts begun in FY94 within PE 0604704F, Project 2479, Common Support Equipment, as a portion of a larger tasking to develop support equipment software standards.</p>			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE _____

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

#7 Operational Systems Development

0708611F, Support Systems Development

PROJECT NO.

3090

B. Program Change Summary (\$ in Thousands)

Previous President's Budget
Appropriated Value
Adjustments to Appropriated Value

a. FY 94 Actuals

b. General Reduction

c. AF & Defense Wide Com

d. **Non-Pay Purchases Inflation**

e. Defense Standardization Program

Current Budget Submit/President's Budget

Change Summary Explanation:

Funding: * FY 94 and FY 95 efforts funded within PE 0708012F, Project 3090, Embedded Computer Resources Support Improvement Program. Funds transfer into PE 0708611F starting in FY96. FY 96 and FY 97 reductions based on inflation adjustments and AF reductions to fund higher priority programs.

Schedule: Not Applicable

Technical: Not Applicable

C. Other Program Funding Summary (\$ in Thousands) See Page 2, C. Other Program Funding Summary

Total
Cost
Continuing

$$\frac{1997}{3,987}$$

1996
4,202

1995
4,585*

1994
5.007*

86-

-62

628-

18

-28

3,117

3,268

4,523

4,909

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)										DATE		February 1995				
BUDGET ACTIVITY					PE NUMBER AND TITLE											
#7 Operational Systems Development					0708611F, Support Systems Development										3090	
D. (U) <u>Schedule Profile</u>																
					<u>1994*</u>				<u>1995*</u>		<u>1996</u>		<u>1997</u>			
					1	2	3	4	1	2	3	4	1	2	3	4
Begin advanced avionics instrumentation and sensor control capability.																
Test data instrumentation collection prototype on F-15 test aircraft.					X											
Demonstrate avionics visualization concepts.					X											
Continue development of prototype virtual simulator.					X											
Preliminary work to use hypermedia on technical manuals.																
Demonstrate automated verification and validation test case generation and evaluation.								X								
Demonstrate hypermedia-based Integrated Product Development (IPD).								X								
Complete adaptive software support study.								X								
Demonstrate virtual node software.								X								
Develop prototype capability for quick/detailed analysis of data from different avionics sources.														X		
Define system monitor and interactive processor architecture for advanced avionics instrumentation.														X		
Demonstrate virtual simulator concept.														X		
* FY 94 and FY 95 efforts funded within PE 0708012F, Project 3090, Embedded Computer Resources Support Improvement Program. Funds transfer into PE 0708611F starting in FY 96.																

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY		DATE												February 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE												3090	
#7 Operational Systems Development		0708611F, Support Systems Development													
D. (U) Schedule Profile (Continued)															
		1994*			1995*			1996			1997				
		1	2	3	4	1	2	3	4	1	2	3	4		
Demonstrate real-time fault tolerant software techniques.															
Demonstrate virtual hypermedia-based support environment.															
Demonstrate automated testing for displays.															
Develop virtual simulator module switching unit.															
Transition RF testing techniques to Air Logistics Centers (ALCs).															
Test and demonstrate data analysis prototype and techniques.															
Continuation of A Broad Based Environment for Test (ABBET) commercial off-the-shelf (COTS) tools evaluation and interface standardization development															
Test and demonstrate virtual simulator module switching unit.															
Demonstrate prototype capability for adaptive interactive instrumentation of advanced avionics systems.															
Transition data analysis/data visualization system and techniques to ALCs.															
Initiate reconfiguration of real-time software.															
capability for dynamic adaptation of avionics to environment for fault tolerance.															
Demonstrate advanced automatic verification and validation testing with displays.															

* FY 94 and FY 95 efforts funded within PE 0708012F, Project 3090, Embedded Computer Resources Support Improvement Program. Funds transfer into PE 0708611F starting in FY 96.

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE _____

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

#7 Operational Systems Development

0708611F, Support Systems Development

PROJECT NO.

3090

A. Project Cost Breakdown (\$ in Thousands)

Begin advanced avionics instrumentation and sensor control.

Test data instrumentation collection prototype on F-15 test aircraft.

Demonstrate avionics visualization concepts.

Continue development of prototype virtual simulator.

Preliminary work to use hypermedia on technical manuals.

Demonstrate automated verification and validation test case generation and evaluation.

Demonstrate hypermedia-based Integrated Product Development (IPD).

Complete adaptive software support study:

Demonstrate virtual node software.

Develop prototype capability for quick/detailed analysis of data from different avionics sources;

Define system monitor and interactive processor architecture for advanced avionics instrumentation.

Demonstrate virtual simulator concept.

Demonstrate real-time fault tolerant software techniques.

Demonstrate virtual hypermedia-based support environment.

Demonstrate automated testing for displays.

Develop virtual simulator module switching unit.

Transition Radio Frequency (RF) testing techniques to Air Logistic Centers (ALCs).

Test and demonstrate data analysis prototype and techniques.

Continue A Broad Based Environment for Test (ABBET) commercial off-the shelf (COTS) tools

evaluation and interface standardization

Test and demonstrate virtual simulator module switching unit

Demonstrate prototype capability for adaptive interactive instrumentation of advanced avionics systems

Transition data analysis/data visualization system and techniques to ALCs:

Initiate reconfiguration of real-time software capability for dynamic adaptation of avionics to environment for fault tolerance

494 dynamic adaptation of avionics to environment

Demonstrate advanced automatic verification and validation testing with displays

Total

Total

* FY 94 and FY 95 efforts funded within PE 0708012F, Project 3090, Embedded Computer Resources Support Improvement Program. Funds transfer into PE 0708611F starting in FY 96.

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Exhibit R-3

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#7 Operational Systems Development	0708611F, Support Systems Development	3090	
B. <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u> Not Applicable			
C. <u>Funding Profile (\$ in Thousands)</u> Not Applicable			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)							DATE		February 1995		
BUDGET ACTIVITY		PE NUMBER AND TITLE					PROJECT NO.				
#7 Operational Systems Development		0708611F, Support Systems Development					3318				
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
3318, Product Data Systems Modernization	3,734***	3,688***	2,149	2,068	2,037	1,978	2,033	2,095	Continuing	Continuing	
A. <u>Mission Description and Budget Item Justification</u>											
(U) This project implements digital product data management within the Air Force Integrated Weapon System Management infrastructure and ensures uninterrupted transition of functional capabilities of legacy systems to the new joint systems. The category of research being performed in this PE is Operational Systems Development because projects are being engineered to support already operational weapon systems.											
(U) FY 1994 (\$ in Thousands)											
- (U) Published final MIL-HDBK 59B (\$40)*.											
- (U) Supported development of document type definitions under technical manual specifications and standards (\$370)*.											
- (U) Supported development of format output specification standards development (\$556)*.											
- (U) Surveyed need for product data/engineering drawings (\$85)*.											
- (U) Examined process improvement opportunities from product data acquisition (\$85)*.											
- (U) Represented Air Force needs at national and international standards activities (\$158)*.											
- (U) Continued to manage the development and implementation of an AF digital product data infrastructure (\$1,195)**.											
- (U) Planned for Air Force participation in Continuous Acquisition and Life Cycle Support (CALS) EXPO 94 (\$85)**.											
- (U) Developed test cases for AF infrastructure to implement CALS (\$485)**.											
- (U) Developed and coordinated digital data strategy (\$450)**.											
- (U) Transitioned Air Force CALS Strategic Plan/Roadmap into electronic document (\$225)**.											
* FY 94 and FY 95 efforts funded within PE 0708012F, Project 3317, Air Force Digital Specifications and Standards. Funds were transferred into PE 0708611F starting in FY 96.											
** FY 94 and FY 95 efforts funded within PE 0604740F, Project 3315, Digital Information Technology Transition. Funds were transferred into PE 0708611F starting in FY 96.											
*** FY 94 and FY 95 efforts funded within PE 0708012F, Project 3317, Air Force Digital Specifications and Standards and PE 0604740F, Project 3315, Digital Information Technology Transition. Amounts shown represent sum from both PEs.											

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#7 Operational Systems Development	0708611F, Support Systems Development	3318	

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- (U) FY 1995 (\$ in Thousands)
 - (U) Continue developing and testing document type definitions and formatting output specifications instances for Joint Continuous Acquisition and Life-Cycle Support (JCALS) Initial Operational Test and Evaluation (IOT&E) (\$500)*.
 - (U) Develop and test specifications and standards in support of Product Data Systems Modernization (PDSM) implementation (\$637)*.
 - (U) Represent AF needs at national and international standards activities (\$82)*.
 - (U) Continue to manage the development and implementation of the Air Force digital product data infrastructure (\$1,410)**.
 - (U) Manage the deployment of digital technical and engineering product data systems such as JCALS and Joint Engineering Data Management and Information Control System (JEDMICS) (\$760)**.
 - (U) Plan and implement the conversion of AF legacy data for use by future systems such as JCALS and JEDMICS (\$70).
 - (U) Coordinate transition from AF legacy data systems to digital technical and engineering product data systems such as JCALS & JEDMICS (\$109)**.
 - (U) Develop and present Continuous Acquisition and Life Cycle Support (CALS) orientation materials and instruction to AF users of digital product data systems such as JCALS & JEDMICS (\$120)**.
- (U) FY 1996 (\$ in Thousands)
 - (U) Continue to manage AF legacy technical orders (TO) conversion. (\$279).
 - (U) Continue to plan/participate/activate AF JEDMICS sites (\$150).
 - (U) Continue to develop digital data templates for use in JCALS (\$151).
 - (U) Continue to plan/participate in JCALS to ensure AF requirements and schedules are met (\$537).
 - (U) Begin to activate AF JCALS sites to ensure timely and accurate data is available and useable (\$301).
 - (U) Continue to test digital data specifications/standards (\$344).
 - (U) Continue direct support to weapon systems, Logistics and Product Centers, and Major Commands (MAJCOMS)(\$387).
- (U) FY 1997 (\$ in Thousands)
 - (U) Continue to manage AF legacy technical orders (TO) conversion (\$268).
 - (U) Continue to plan/participate/activate AF JEDMICS sites (\$139).
 - (U) Continue to develop digital data templates for use in JCALS (\$140).
 - (U) Continue to plan/participate in JCALS to ensure AF requirements and schedules are met (\$522).
 - (U) Continue to activate AF JCALS sites to ensure timely and accurate data is available and useable (\$290).
 - (U) Continue to test digital data specifications/standards (\$333).
 - (U) Continue direct support to weapon systems, Logistics and Product Centers, and MAJCOMS (\$376).

* FY 94 and FY 95 efforts funded within PE 0708012F, Project 3317, Air Force Digital Specifications and Standards. Funds were transferred into PE 0708611F starting in FY 96.

** FY 94 and FY 95 efforts funded within PE 0604740F, Project 3315, Digital Information Technology Transition. Funds were transferred into PE 0708611F starting in FY 96.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

#7 Operational Systems Development

0708611F, Support Systems Development

3318

B. Program Change Summary (\$ in Thousands)

	1994	1995	1996	1997	Total Cost
Previous President's Budget	3,774*	3,888*	2,162*	2,079*	Continuing
Appropriated Value					
Adjustments to Appropriated Value					
a. FY 94 Actuals	-40				
b. General Reduction		-100			
c. Small Business Innovative Research (SBIR)		-100			
d. Non-pay Purchases Inflation			-13	-11	
Current Budget Submit/President's Budget	3,734	3,688	2,149	2,068	Continuing

Change Summary Explanation:

Funding: * Funds were transferred into PE 0708611F starting in FY96 from PE 0708012F and PE 0604740 for Project 3318, Product Data Systems Modernization. FY 96 and FY 97 reductions based on inflation adjustments.

Schedule: Not Applicable

Technical: Not Applicable

C. Other Program Funding Summary (\$ in Thousands) Not Applicable

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)									
BUDGET ACTIVITY					DATE				
PE NUMBER AND TITLE					PROJECT NO.				
#7 Operational Systems Development					0708611F, Support Systems Development				
					3318				
D. (U) <u>Schedule Profile</u>									
</									

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY		DATE												PROJECT NO.
#7 Operational Systems Development		0708611F, Support Systems Development												3318
		PE NUMBER AND TITLE												
		1994			1995			1996			1997			
		1	2	3	4	1	2	3	4	1	2	3	4	
D. (U)	Schedule Profile (Continued)													
Continue developing and testing document type definitions and formatting output specifications instances for Joint Computer-aided Acquisition and Life-Cycle Support (JCALS) Initial Operational Test and Evaluation (IOT&E)*.														
Develop and test specifications and standards*.														
Manage the deployment of digital technical and engineering product data systems such as JCALS and Joint Engineering Data Management and Information Control System (JEDMICS)**.														
Plan and implement the conversion of AF legacy data for use by future systems such as JCALS and JEDMICS**.														
Coordinate transition from AF legacy data systems**.														
Develop and present the Continuous Acquisition and Life-Cycle Support (CALS) orientation materials and instruction to AF users**.														
Continue to manage AF legacy technical order (TO) conversion.														
Continue to plan/participate/activate AF JEDMICS sites.														
Continue to develop digital data templates.														
Continue to plan/participate in JCALS.														
Begin to activate JCALS sites.														
Continue to test digital data specifications and standards.														
Continue direct support to weapon systems.														
<p>* FY 94 and FY 95 efforts funded within PE 0708012F, Project 3317, Air Force Digital Specifications and Standards. Funds were transferred into PE 0708611F starting in FY 96.</p> <p>** FY 94 and FY 95 efforts funded within PE 0604740F, Project 3315, Digital Information Technology Transition. Funds were transferred into PE 0708611F starting in FY 96.</p>														

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)			DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.		
#7 Operational Systems Development	0708611F, Support Systems Development	3318		
A. <u>Project Cost Breakdown (\$ in Thousands)</u>				
Publish final MIL-HDBK 59B.	1994	1995	1996	1997
Develop and test document type definitions and format output specifications standards.	40*			
Survey need for drawings.	926*	500*		
Examine process improvement opportunities.	85*			
Represent AF needs at national and international standards activities.	85*			
Continue to manage the development and implementation of an AF digital product data infrastructure.	158*	82*		
Continuous Acquisition and Life-Cycle Support (CALS) EXPO 94 Planning.	1,195**	1,410**		
Develop test cases for AF infrastructure to implement CALS.	85**			
Develop and coordinate digital data strategy.	485**			
Transition Air Force CALS Strategic Plan/Roadmap into electronic document.	450**			
Develop and test digital data specifications/standards.	225**			
Manage the deployment of digital technical and engineering product data systems such as Joint Continuous Acquisition and Life-Cycle Support (JCALS) and Joint Engineering Data Management and Information Control System (JEDMICS).		637*	344	333
Plan and implement the conversion of AF legacy data for use by future systems.		760**		
Coordinate transition from AF legacy data systems.		70**		
Develop and present CALS orientation materials and instruction to AF users.		109**	279	268
Continue to plan/participate/activate JEDMICS sites.		120**		
Continue to develop digital data templates for use in JCALS.			150	139
Continue to plan/participate in JCALS to ensure AF requirements and schedules are met.			151	140
Activate AF JCALS sites to ensure timely and accurate data is available and useable.			537	522
Continue direct support to weapon systems (C-17, Titan IV, VCX, T-1A, F-22, etc.), Logistics and Product Centers, and Major Commands (MAJCOMS).			301	290
Total	3,734***	3,688***	387	376
			2,149	2,068

* Funded within PE 0708012F, Project 3317, Air Force Digital Specifications and Standards.

** Funded within PE 0604740F, Project 3315, Digital Information Technology Transition.

*** Amounts shown represent sum from both PE 0708012F and PE 0604740F.

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#7 Operational Systems Development	0708611F, Support Systems Development	3318	
B. <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u> Not Applicable			
C. <u>Funding Profile (\$ in Thousands)</u> Not Applicable			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

BUDGET ACTIVITY		PE NUMBER AND TITLE							DATE	PROJECT NO.
#7 Operational Systems Development		0708611F, Support Systems Development							February 1995	3759
COST (\$ in Thousands)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
3759, Air Force Support Equipment Management (AFSEM)	740*	663*	489	477	506	540	553	567	Continuing	Continuing
<p>A. Mission Description and Budget Item Justification</p> <p>(U) The Automatic Test Systems (ATS) Product Group Manager (PGM) Product Master Plan (PMP) and ATS Database development effort is designed to give the ATS Product Group Manager (PGM) the tools to track and plan Air Force ATS direction. The PMP will support standardization and ATS PGM long-term planning by capturing essential data on all Air Force ATS. The Database will include all ATS identified in the PMP and be used to interface with Integrated Weapon System Master Plans. The ATS Database will also include the ATS Preferred Item List (PIL). It will provide ATS users and managers the capability to match new test requirements to existing test capabilities and ATS developments. The category of research being performed in this PE is Operational Systems Development because projects are being engineered to support already operational weapon systems.</p> <p>(U) <u>FY 1994 (\$ in Thousands)*</u></p> <ul style="list-style-type: none"> - (U) Continued development of Automatic Test Systems (ATS) Master Plans (\$415) - (U) Develop the Air Force ATS Preferred Item List (PIL) (\$40) - (U) Program the database and collect parametric data on the ATS PIL (\$245) - (U) Program Management support (\$40) <p>(U) <u>FY 1995 (\$ in Thousands)*</u></p> <ul style="list-style-type: none"> - (U) Complete development of the ATS Master Plans (\$430) - (U) Continue ATS Product Master Plan (PMP) data maintenance (\$10) - (U) Program upgrades to the ATS Database (\$30) - (U) Update and maintain ATS PIL Database (\$147) - (U) Program Management support (\$46) <p>* FY 94 and FY 95 efforts funded within PE 0604704F, Project 3759, Air Force Support Equipment Management. Funds transfer into PE 0708611F starting in FY 96.</p>										

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#7 Operational Systems Development	0708611F, Support Systems Development	3759	
<p>(U) <u>EY 1996 (\$ in Thousands)</u></p> <ul style="list-style-type: none">- (U) Develop detailed Product Line Master Plans (\$362)- (U) Continue Automatic Test Systems (ATS) Product Master Plan (PMP) data maintenance (\$20)- (U) Program upgrades to the ATS Database (\$20)- (U) Update and maintain ATS Preferred Item List (PIL) Database (\$35K)- (U) Upgrade Database hardware/software (\$14)- (U) Program Management Support (\$38) <p>(U) <u>EY 1997 (\$ in Thousands)</u></p> <ul style="list-style-type: none">- (U) Develop detailed Product Line Master Plans (\$349)- (U) Continue ATS PMP data maintenance (\$35)- (U) Program upgrades to the ATS Database (\$20)- (U) Update and maintain ATS PIL Database (\$35)- (U) Program Management Support (\$38)			

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)			DATE	February 1995	PROJECT NO.
BUDGET ACTIVITY	PE NUMBER AND TITLE		PROJECT NO.		
#7 Operational Systems Development	0708611F, Support Systems Development		3759		
B. <u>Program Change Summary (\$ in Thousands)</u>					
Previous President's Budget	1994	1995	1996	1997	Total
Appropriated Value	700*	693*	491	479	Cost
Adjustments to Appropriated Value					Continuing
a. FY 94 Actuals	+40				
b. General Reduction		-17			
c. Small Business Innovative Research (SBIR)		-13			
d. Non-pay purchases Inflation			-2	-2	
Current Budget Submit/President's Budget	740	663	489	477	Continuing
Change Summary Explanation:					
Funding: * FY 94 and FY 95 efforts funded within PE 0604704F, Project 3759, Air Force Support Equipment Management. Funds transfer into PE 0708611F starting in FY96. FY 96 and FY 97 reductions due to inflation adjustments.					
Schedule: Not Applicable					
Technical: Not Applicable					

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE _____

February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

PROJECT NO.

#7 Operational Systems Development

0708611F, Support Systems Development

3759

C. Other Program Funding Summary (\$ in Thousands) Not Applicable

D. (U) Schedule Profile

1994*	1995*	1996	1997
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4

- Continued development of Automatic Test Systems (ATS) Master Plans
- Develop the Air Force ATS Preferred Item List (PIL)
- Program the database and collect parametric data on the ATS PIL
- Program Management support
- Complete development of the ATS Master Plans
- Continue ATS Product Master Plan (PMP) data maintenance
- Program upgrades to the ATS Database
- Update and maintain ATS PIL Database
- Develop detailed Product Line Master Plans.
- Upgrade Database hardware and software.

* FY 94 and FY 95 efforts funded within PE 0604704F, Project 3759, Air Force Support Equipment Management. Funds transfer into PE 0708611F starting in FY 96.

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RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE	February 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT NO.	
#7 Operational Systems Development	0708611F, Support Systems Development	3759	
A. <u>Project Cost Breakdown (\$ in Thousands)</u>			
	1994*	1995*	1996
Develop Product Line Master Plan	415	430	362
Develop Automatic Test Systems			
(ATS) Preferred Item List (PIL) Database	285	147	
Update ATS PIL Database			
Update ATS Database		30	35
ATS Product Master Plan (PMP) data			20
maintenance		10	35
Program Management Support	40	46	38
Total	740*	663*	477
B. <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u>	Not Applicable		
C. <u>Funding Profile (\$ in Thousands)</u>	Not Applicable		

* FY 94 and FY 95 efforts funded within PE 0604704F, Project 3759, Air Force Support Equipment Management. Funds transfer into PE 0708611F starting in FY 96.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE
February 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE PROJECT NO.

7. Operational Systems Development

0804734F, CRYPTO/SIGINT Related Skill Training

1005

	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Project 1005, SENTINEL BRIGHT Phase II/SENTINEL II	1.885	1.441	1.139	1.954	1.498	0	0	0	7.917	7.917

A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT:

- Supports completion of SENTINEL BRIGHT Phase II (SBII)/SENTINEL II (SII) software development/integration
- Development and acquisition of computer aided/computer managed instruction for intelligence personnel
 - SBII supports cryptologic analysts and maintenance personnel
 - SENTINEL ASPEN II (SAII) supports general military intelligence analysts
 - SII integrates SBII and SAI with common software on like hardware
- Program parallels the fielding of modernized operational intelligence systems
- Corrects long-standing deficiencies in training "mission ready technicians"

(U) FY 1994

(U) - SENTINEL II Contract (1099)
 (U) - Program Office (726)
 (U) - CBT Upgrade (60)

(U) FY 1995

(U) - SENTINEL II Contract (406)
 (U) - Courseware Development (168)
 (U) - Program Office (867)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)		DATE February 1995			
BUDGET ACTIVITY	PE NUMBER AND TITLE PROJECT NO.				
7. Operational Systems Development	08043734F, CRYPTO/SIGINT Related Skill Training	1005			
(U) <u>FY96 Plans:</u>					
(U) - SENTINEL II Contract (1017)					
(U) - Program Office (122)					
(U) <u>FY97 Plans:</u>					
(U) - SENTINEL II Contract (802)					
(U) - Courseware Development (332)					
(U) - Program Office (820)					
B. <u>Program Change Summary (\$ in Thousands)</u>					
	FY94	FY95	FY96	FY97	Total Cost
Previous President's Budget	1926	1526	1139	1954	8.058
Appropriated Value	1926	1526			
Adjustments to Appropriated Value					
General Congressional Reductions	-11	-54			
SBIR	-30	-31			
Current Budget Submit/President's Budget	1885	1441	1139	1954	
C. <u>Other Program Funding Summary (\$ in Thousands)</u>					
NOT APPLICABLE ;					
D. <u>Schedule Profile</u>					
NOT APPLICABLE					

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)		DATE
BUDGET ACTIVITY		February 1994
7. Operational Systems Development	PE NUMBER AND TITLE PROJECT NO. 0804734, CRYPTO/SIGINT Related Skill Training 1005	
A. <u>Project Cost Breakdown (\$ in Thousands)</u>		
	<u>1994</u>	<u>1995</u>
1. Software Development	1.129	.580
2. System Engineering Support	.701	.685
3. Configuration Management		.073
4. Travel	.055	.103
Total	1.885	1.441
B. <u>Budget Acquisition History and Planning Information (\$ in Thousands)</u>	<u>1996</u>	<u>1997</u>
NOT APPLICABLE	1.017	1.123
C. <u>Funding Profile (\$ in Thousands)</u>	.122	.614
NOT APPLICABLE	.082	
	.135	
	1.139	1.954

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	
BUDGET ACTIVITY										February, 1995	
PE NUMBER AND TITLE											
0901218F Civilian Compensation Program											
7 - Operational System Development											
COST (In Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
1	Civilian Compensation Program	5,775	5,655	5,827	5,917	6,146	6,401	6,593	6,791	Continuing	TBD
<p>(U) <u>A. Mission Description and Budget Item Justification</u></p> <p>This program element provides for payment of civilian compensation benefits for disability due to personal injury sustained while in the performance of duty or due to employment-related disease according to the Federal Employees Compensation Act (FECA) under Title 5 U.S.C. Chapter 81. The Department of Labor (DOL) administers this program and charges the Department of the Air Force for its employee costs. The PE excludes manpower authorizations and costs.</p> <p>(U) <u>FY 1994</u></p> <p>- (U) \$5,755 million cited above funded disability compensation of personnel assigned to RDT&E activities for injuries and/or illnesses in the performance of duties or due to employment-related disease.</p> <p>(U) <u>FY 1995</u></p> <p>- (U) \$5,655 million funds a level of effort program based on bills already received to compensate employees assigned to RDT&E facilities for work-related injury or disease</p> <p>(U) <u>FY 1996</u></p> <p>- (U) \$5,827 million funds to continue a level of effort program to compensate employees assigned to RDT&E facilities for work-related injury or disease.</p> <p>(U) <u>FY 1997</u></p> <p>- (U) \$5,917 million requested to continue a level of effort program to compensate employees assigned to RDT&E facilities for work-related injury or disease.</p>											

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Exhibit R-2

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE _____

February, 1995

BUDGET ACTIVITY

PE NUMBER AND TITLE

7 - Operational System Development

0901218F Civilian Compensation Program

(U) B. Program Change Summary (\$ in Thousands)

	FY 1994	FY 1995	FY 1996	FY 1997	Total
(U) Previous President's Budget	5775	5655	5860	5951	Cost
(U) Appropriated Value		5655			TBD
(U) Current Budget Submitted/President's Budget	5775	5655	5827	5917	TBD

(U) Change Summary Explanation:

Funding: Due to general reductions.

Schedule: Not applicable

Technical: Not applicable

(U) C. Other Program Funding Summary (\$ in Thousands)

	<u>FY 1994</u>	<u>FY 1995</u>	<u>FY 1996</u>	<u>FY 1997</u>	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	To Compl Cont'd	Total Cost TBD
(U) Operation and Maintenance (O&M)	21054	20641	23814	21283	21562	22355	22679	23528		

(U) D. Schedule Profile: Not applicable

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)										DATE	February, 1995	
BUDGET ACTIVITY		PE NUMBER AND TITLE								PROJECT		
7 - Operational System Development		1001004F International Activities								00AH		
COST (in Thousands)		FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost	
00AH	Shape Tech Center, VKI, AGARD, AFIPSA, ICRD&A Support	1,896	1,915	3,713	3,762	3,901	4,050	4,169	4,287	Continuing	TBD	

A. Mission Description and Budget Item Justification

The mission of this budget activity is to gain access to the world's best defense technologies, eliminate costly duplication of research and development efforts, accelerate availability of defense systems, and to deploy and sustain common or interoperable USAF and Allied equipment through international cooperative research and development.

The USAF is party to multiple international cooperative agreements to solve common US and Allied military scientific and technological problems and to develop materiel solutions to harmonize coalition requirements. This budget activity funds the Department of the Air Force to support, develop, process, negotiate, implement, and manage these international cooperative agreements and projects in compliance with statutory reporting provisions and exacting legal statutes, fiscal constraints, technology transfer controls, intellectual property rights, third party transfer provisions, quid-pro-quo criteria, industrial base factors, and political-military interests. Included in this budget are domestic and international technology assessment teams; specialized working groups; long-term technology project developments; support for cooperative opportunity assessments; developing, processing, and negotiating international agreements; oversight of international cooperative research and development (R&D) projects; overseas R&D liaison and coordination offices; bilateral and multilateral staff talks; exchanges of scientist and engineers; and the US share of the budget for the Von Karman Institute (VKI), NATO Air Force Armaments Group (NAFAG), and NATO Advisory Group for Aerospace Research and Development (AGARD).

Justification for Budget Activity Assignment

This program element funds general R&D management for all USAF international cooperative R&D. This includes management support and execution of projects in (1) Basic Research (2) Concept Exploration (3) Demonstration and Validation (4) Engineering and Manufacturing Development and (5) Production.

(U) FY 1994 Accomplishments:

- (U) SHAPE Technical Center (STC) R&D Coordination Office - Funded US R&D coordination office and its administrative support to eight US professionals assigned to the STC. (\$100)
- (U) Von Karman Institute (VKI) - Funded US share of residual VKI budget. (\$202)
- (U) Advisory Group for Aerospace R&D (AGARD) - Funded US national-level representation at HQ AGARD Delegates Board and technical experts from Air Force field-level and US industry/university-level to support 7 technical panels, 21 working groups, and 1 study committee sponsored by NATO AGARD. Funded technical reports and exchanges in 14 areas as follows: (1) High Power Microwaves (2) Aircraft Load Factors and Impact of Acoustics and Turbulence, (3) Erosion, Corrosion and Foreign Object Damage Effects in Gas Turbine Engines (4) Guidance and Control Techniques for Future Air Defense Systems (5) Dual Use of Military and Commercial Technology in Guidance and Control (6) Issues and Advances in Aeromedical Evacuation (7) Low-Level Nap-of-the-Earth Night Operations (8) Space System

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE February, 1995		PROJECT 00AH
BUDGET ACTIVITY	PE NUMBER AND TITLE	
7 - Operational System Development	1001004F International Activities	
<p>Design and Development (9) Composite Repair of Aircraft Structures (10) Corrosion, Detection and Management of Advanced Airframe Materials (11) Aerodynamics and Aeroacoustics of Rotorcraft (12) Propagation Assessment in Coastal Environments (13) Reconnaissance, Surveillance and Target Acquisition Architecture to Meet NATO's Reaction Force Requirements (14) Non-Lethal Means for Diverting or Forcing Non-Cooperative Aircraft to Land. (\$500)</p> <p>- (U) Air Force International Programs Support Activity (AFIPSA) - Funded AFIPSA as the consolidated Air Force process center for international cooperative research and development agreements. The following 19 agreements were signed in FY94: Australia: (1) Master R&D and Engineering Agreement (2) Radar Tracking Project (3) Radar Detection and Warning Project; Finland: (1) Master Information Exchange Agreement; France: (1) Master Technology Research and Development Agreement (2) Aircraft Vulnerability Studies (3) Hypervelocity Vehicle Tire Loan; Germany: (1) Emulsifier and Support Equipment Loan (2) High Energy Lasers; Israel: (1) Advanced Technology Anti-G Suit Loan; The Netherlands: (1) Wind Tunnel; Norway: (1) Master Environmental R&D Agreement (2) Aircraft Shelters Project; Turkey: (1) Advanced Technology Anti-G Suit Loan; United Kingdom: (1) Master Information Exchange Agreement (2) Master Engineer and Scientist Exchange Agreement (3) Turbine Engine Technology (4) Conventional Air Launched Munitions. (\$426)</p> <p>- (U) International Cooperative Research, Development and Acquisition (ICRD&A) - Funded Air Force Materiel Command and HQ Air Force ICRD&A activities to identify, assess, and develop support packages for new Air Force international cooperative projects culminating in the approval of the above listed international agreements and processing of 31 new candidate agreements. Funded USAF headquarters and field-level representation at the US-Japan Systems and Technology Forum, NATO Four-Power Council, NAFAG and its 5 Subgroups to promote NATO harmonization of requirements, standardization, and development of international cooperative R&D programs. Supported engineer and scientists exchanges with 14 nations. Funded USAF overseas R&D liaison offices. Funded management support and oversight of USAF Foreign Comparative Test Program and Nunn Cooperative R&D Program. Supported assessments and acquisition of technology from the newly independent states of the Former Soviet Union. (\$668)</p> <p>(U) FY 1995:</p> <p>- (U) STC - Fund US R&D coordination office and administrative support to eight US professionals assigned to the STC. (\$80)</p> <p>- (U) VKI - Fund US share (12.8%) of VKI budget as approved by US Mission NATO. (\$400)</p> <p>- (U) AGARD - Fund US national-level representation at HQ AGARD Delegates Board. Fund the 1995 AGARD National Delegates Board Meeting in the US as the host nation. Fund technical experts from Air Force field-level and US industry/university-level to support 7 technical panels, 21 working groups, 4 study groups, and 1 study committee sponsored by NATO AGARD. Fund technical reports and exchanges in 12 areas as follows: (1) Limitations and Enhancement in Situational Awareness (2) Aerodynamics of Stores Integration and Separation (3) Loss Mechanisms and Unsteady Flow in Turbomachinery (4) Advanced Aeroviscoelastic Testing and Data Analysis (5) Widespread Fatigue Damage in Military Aircraft (6) Neurological Limitations of Aircraft Operations: Human Performance Implications (7) Progress and Challenges in Computational Fluid Dynamics Methods and Algorithms (8) Advanced Aero-Engine Concepts and Controls (9) Practical Implications of Thermal Mechanical Fatigue in Performance of Military Aircraft Engines (10) Design, Qualification, and Maintenance of Vibration-Free Landing Gear (11) Enhancing the Survivability of Military Transport Aircraft (12) Use of Commercial Satellites for Military Applications. Expand Partnership for Peace initiative through AGARD outreach program incorporating Eastern Europe and Former Soviet Union scientific and technical groups. (\$440)</p> <p>- (U) AFIPSA - Fund USAF management of International Cooperative R&D Agreements. We anticipate approximately 31 agreements will be needed for signature in FY95, as follows: Australia: (1) Aircraft and Stores Compatibility Testing; Canada: (1) Master Technology, Research and Development Agreement (2) Lens Antenna Deployment Demonstration Test (3) Unmanned Aerial Vehicle (4) Air Base Operability (5) High Powered Microwaves; Four-Powers (Germany, France, UK, and US): (1) High Powered Microwaves Project (2) Military Aircraft Survivability (3) Electro-Optics Technology (4) Future Multi-Band Tactical Radio; France: (1) Image/Information</p>		

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)			DATE	February, 1995
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT		
7 - Operational System Development	1001004F International Activities	00AH		
<p>Reformater (2) Satellite Early-Warning (3) Optical Properties of the Atmosphere (4) Flight in Adverse Atmosphere Conditions (5) Future Equipment for Pilots (6) Airborne Electronic Countermeasures (7) Ground-Based Radars Operating in the HF and Low VHF Bands Data; Germany: (1) Master Research and Technology Project Agreement (2) Environmental R&D (3) Wind Tunnel and Flight Simulation; Israel: (1) Electronic Warfare; Italy: (1) Non-Destructive Evaluation of Composite Materials; The Netherlands: (1) Infrared Celestial Background (2) Unmanned Aerial Vehicles; NATO: (1) NATO AWACS Radar System Improvement; United Kingdom: (1) Master Technology Research and Development Agreement (2) Aircrew Protection (3) Mass and Performance Estimation Methodology (4) Future Space Systems and Concepts (5) Battlefield Identification (6) Wind Tunnel Test Technology. (\$113)</p> <p>- (U) ICRD&A - Fund Air Force Materiel Command and HQ Air Force ICRD&A activities to identify, assess, and develop support packages for new Air Force international cooperative projects culminating in the approval of the above listed international agreements and processing of 42 new candidate agreements. Fund USAF leadership initiatives as the new Chair of the NATO Air Force Armaments Group (NAFAG). Fund USAF headquarters and field-level representation at the US-Japan Systems and Technology Forum, NATO Four-Power Council, NAFAG and its 6 Subgroups to promote harmonization of requirements, standardization, and development of international cooperative R&D programs. Support engineer and scientists exchanges with 14 nations. Fund USAF overseas R&D liaison offices. Fund management support and oversight of USAF Foreign Comparative Test Program and Nunn Cooperative R&D Program. Partially fund deployment of the Joint STARS System to promote it as part of the solution to the NATO Alliance Ground Surveillance requirement. Fund acquisition and assessment of technology from the newly independent states of the Former Soviet Union. (\$882)</p>				
<p>(U) FY1996</p> <p>- (U) STC - Fully fund US R&D coordination office and administrative support to US professionals assigned to the STC. (\$100)</p> <p>- (U) VKI - Fully fund US share (12.8%) of VKI budget as approved by US Mission NATO (\$500). Award two USAF VKI fellowships. (\$20)</p> <p>- (U) AGARD - Fully fund US national-level representation at HQ AGARD Delegates Board. Fund technical experts from Air Force field-level and US industry/university-level to support 7 technical panels, 21 working groups, 4 study groups, and 1 study committee sponsored by NATO AGARD. Fund technical reports and exchanges in 13 areas as follows: (1) Minimizing Collateral Damage During Peace Support Operations (2) Radar Cross-Section Analysis and Imaging of Military Targets (3) Remote Sensing (4) Space Systems Contributions to NATO Defense Strategy (5) Advanced Architectures for Mission Avionics (6) Characterization and Modification of Wakes from Lifting Vehicles in Fluids (7) Aerodynamics of Wind Tunnel Circuits and their Components (8) Aging Combat Aircraft Fleets - Long Term Implications (9) Smart Structures and Materials - Implications for Military Aircraft of a New Generation (10) Medical Complications and Screening for Sustained High-G and Positive Pressure Breathing (11) Service-Life of Solid Rocket Propellants (12) Acute Visual and Cognitive Incapacitation of Aircrews: Protection Management and Cockpit Integration (13) Aircraft Fire Safety. Continue the Partnership for Peace initiative through AGARD outreach program incorporating additional Eastern Europe and Former Soviet Union scientific and technical groups. (\$500)</p> <p>- (U) AFIPSA - Fully fund AFIPSA and USAF to clear a growing backlog of approximately 84 proposals for International Cooperative R&D Agreements. The following is a sample list of 42 candidate agreements for signature in FY96: Australia: (1) Passive Sensors (2) Semiconductor Materials and Microelectronics Circuits; Brazil: (1) Ionospheric Experiments (2) Engineer and Scientist Exchange Agreement; Canada: (1) Infrared Spectral Imaging (2) Lithium Battery Technology (3) Human System Interfaces (4) Computational Electromagnetic; Egypt: (1) Seismic Monitoring Station; Four-Powers (Germany, France, UK, and US): (1) Human Effects of Directed Energy (2) Non-Destructive Evaluation Techniques (3) Integrated Sensor System (4) Technology Beyond Visual Range (5) Insensitive High Explosive (6) Tactical Laser Hardened Material Exchange; France: (1) Nuclear Propulsion (2) Synthetic Aperture Radar Imaging (3) Sensor Data Fusion (4) Photonics (5) Aerial Reconnaissance and Geographics (6) International Military Satellite Project Definition; Germany: (1) Boron-Fueled Variable Flow Ducted Rocket (2) Hard Target Defeat Technology (3) Armament Defeat</p>				

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

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Technology (4) Hard Target Defeat Penetrators; Israel: (1) Indium Phosphide Optical Devices and Circuits (2) Pulsed Laser Deposited Coatings; Japan: (1) F-15 Upgrade Program (2) FS-X Production (3) Bioprocessing for Decontamination (4) Environmentally Compatible Solid Rocket Propellants; Multilateral: (1) Master Advanced Medium Range Air-To-Air Missile (AMRAAM) Users' Group Agreement (2) Command Control Communications and Intelligence (C3I) Interoperability; NATO: (1) NATO AWACS Electronic Support Measures (2) Alliance Ground Surveillance Embryonic Program Office; Russia: (1) Seismic Monitoring Station (2) Master Data Exchange Agreement; Turkey: (1) Seismic Monitoring Station; United Kingdom: (1) Joint Tactical Information Distribution System (2) Combat Air Operations Center (3) Variable Flow Ducted Rocket (4) Non-Cooperative Target Recognition (5) Airborne Tactical Communications (6) International Military Satellite Project Definition. (\$250)

- (U) ICRD&A - Fully fund Air Force Materiel Command and HQ Air Force ICRD&A activities to identify, assess, and develop support packages for new Air Force international cooperative projects culminating in the approval of the above listed international agreements and processing of 85 new candidate agreements. Fund USAF leadership initiatives as the Chair of the NAFAG. Fund USAF headquarters and field-level representation at the US-Japan Systems and Technology Forum, NATO Four-Power Council, NAFAG and its 6 Subgroups to promote harmonization of requirements, standardization, and development of international cooperative R&D programs. Support engineer and scientists exchanges with 14 nations. Fund USAF overseas R&D liaison offices. Fund management support and oversight of USAF Foreign Comparative Test Program and Nunn Cooperative R&D Program. Fund expanded technology acquisition contracts and follow-on assessments of Russian technology. Explore opportunities for US-Russian cooperative R&D projects. Partially fund start-up costs of promising out-of-cycle cooperative R&D programs by matching program funds. (\$2,343)

(U) FY1997

- (U) STC - Fund US R&D coordination office and administrative support to US professionals assigned to the STC. (\$100)
- (U) VKI - Fund US share (12.8%) of VKI budget as approved by US Mission NATO (\$500). Award two USAF VKI fellowships. (\$20)
- (U) AGARD - Fully fund US national-level representation at HQ AGARD Delegates Board. Fund technical experts from Air Force field-level and US industry/university-level to support 7 technical panels, 21 working groups, 4 study groups, and 1 study committee sponsored by NATO AGARD. Fund technical reports and exchanges documented in the AGARD FY97 Program of Work as endorsed by US National Delegate and approved by the HQ AGARD National Delegates Board and NATO Military Committee. Continue Partnership for Peace initiative through the AGARD outreach program incorporating new scientist and engineers from Central Europe. (\$500)
- (U) AFIPSA - Fully fund AFIPSA to continue clear the backlog of approximately 85 proposals for International Cooperative R&D Agreements. The following is a sample list of 42 candidate agreements for signature in FY97: Australia: (1) Software Engineering; Canada (1) Avionics (2) Synthetic Aperture Radar (3) Infrared Sensors; Four-Powers (Germany, France, UK, and US): (1) Three Long-Term Technology Project Arrangements; France: (1) Laser Radar (2) Formulation and Testing of More Energetic Materials (3) High Temperature Graphite Materials (4) Over-the Horizon Backscatter Radar Ionospheric Clutter; Germany: (1) Machine Intelligence and Robotics (2) High Strength Plastics (3) Photonics (4) 3-D Image Processing (5) High Temperature Materials for Superconductivity (6) Data Fusion; Israel: (1) Hypervelocity Projectiles; Japan: (1) Data Fusion Displays and Components (2) Pattern Recognition (3) Multi-Band Capable Components (4) Low-Loss Fiber Optics (5) Photo-Conductive Switching (6) Digital Superconducting Devices (7) Process and Fabrication Techniques; Korea: (1) Seismic Monitoring Station (2) Hard Target Penetration; Multilateral: (1) AMRAAM Users' Group Improvement Project; NATO: (1) Alliance Ground Surveillance System; Norway: (1) Air Battle Management and C3I; Pakistan: (1) Seismic Monitoring Station; Peoples Republic of China: (1) Seismic Monitoring Station; Russia: (1) Biotechnology, Biocybernetics, Neural Networks (2) Energetic Materials (3) Human Acceleration and Performance (4) Tribological Coatings and Application Processes (5) Ultra Pure Gallium Arsenide Compounds (6)

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE	PROJECT
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7 - Operational System Development	1001004F International Activities		00AH
<p>Hypersonic Wind Tunnel Technology (7) Human Factors in Space (8) High Speed Propulsion Technology; Sweden: (1) Computational Fluid Dynamics (2) Neural Computing for Pattern Recognition; United Kingdom: (1) Neural Networks for Radar Processing (2) High Performance Distributed Computing (\$250)</p> <p>- (U) ICRD&A - Fully fund Air Force Materiel Command and HQ Air Force ICRD&A activities to identify, assess, and develop support packages for new Air Force international cooperative projects culminating in the approval of the above listed international agreements and processing of approximately 90 new candidate agreements. Fund USAF headquarters and field-level representation at the US-Japan Systems and Technology Forum, NATO Four-Power Council, NAFAG and its 6 Subgroups to promote harmonization of requirements, standardization, and development of international cooperative R&D programs. Fund engineer and scientists exchanges with 14 nations. Fund USAF overseas R&D liaison offices. Fund management support and oversight of USAF Foreign Comparative Test Program and Nunn Cooperative R&D Program. Fund enhanced cooperative opportunity assessments of Russian technology projects and associated negotiations. Partially fund start-up costs of promising out-of-cycle cooperative R&D programs by matching program funds. (\$2,392)</p> <p>(U) Acquisition Strategy:</p> <p>This program element is the only source of USAF funds to pursue opportunities for international armament's cooperation to (a) deploy and support common or interoperable equipment with our allies; (b) leverage USAF resources with our allies through cost sharing and economies of scale; and (c) exploit the best US and allied technologies for equipping coalition forces. We obtain these benefits only after international cooperative opportunities are identified, explored, developed, assessed and after the international agreements are negotiated and concluded. This program element provides funds to execute up front armaments cooperation responsibilities, rationalize cooperative opportunities, assess allied technologies, and generate sound, cost-effective cooperative programs between the USAF and our international partners. Once these initiatives and programs are started as international efforts they are transferred to the appropriate technology or systems program office and are funded in their own program elements.</p>			

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(U) B. Program Change Summary (\$ in Thousands)

(U) Previous President's Budget	FY1994 1,909	FY1995 3,436	FY1996 3,339	FY1997 3,378	Total Cost TBD
(U) Appropriated Value					
Adjustments to Appropriated Value					
a. AF Cut		-1,521			
b. Cooperative Opportunities			374	384	
c. Cong General Reductions	-40				
(U) Current Budget Submit/President's Budget	1,869	1,915	3,713	3,762	

(U) Change Summary Explanation:

Funding: For this program element, Congress cut the FY94 President's Budget request from \$3,820 to \$1,909, and again in FY95 from \$3,436 to \$1,915. This has significantly affected the USAF's ability to proactively support DoD's Renaissance in Armament Cooperation with foreign countries. FY96 and FY97 have been increased to cover cooperative opportunities to promote additional ICRD&A programs with our allies.

Schedule: N/A

Technical: The FY94 and FY95 congressional reductions forced us to cancel all new ICRD&A initiatives funded by this Program Element, severely restricted USAF participation in International Cooperative Armaments Forums, and reduced the number of Fellowships in support of VKI.

(U) C. Other Program Funding

Procurement Line P-1 N/A

Milcon Project N/A

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Related RDT&E:															
(U) This program provides for USAF management of DoD funded R&D Nunn (PE 0605130D) and Foreign Comparative Test (FCT) (PE 0603790D) programs. It also provides international agreement support for 6.1 through 6.3 programs for USAF Laboratories and for 6.4 through 6.5 programs for USAF Product and Logistic Centers.															
(U) D. Schedule Profile															
(U)		FY 1994		FY 1995		FY 1996		FY 1997							
		1	2	3	4	1	2	3	4	1	2	3	4		
	-SHAPE Technical Center	X		X		X		X		X		X			
	-VKI Board of Directors	X	X			X	X			X	X				
	-AGARD Delegate Board	X	X		X	X	X			X	X				X
	-Aerospace Applications Studies Committee	X			X	X				X					
	-Bilateral Technology R&D Projects MOUs	X			X					X					
	-Cooperative R&D Projects	X	X		X	X	X		X	X	X	X	X	X	X
	-R&D Loans of Defense Equipment	X	X	X	X	X	X		X	X	X	X	X	X	X
	-Systems & Technology Forum (JA)		X		X	X	X		X		X				X
	-Other Bilateral forums (CA,BZ)				X	X	X		X	X	X	X	X	X	X
	-Data/Information Exchange Annexes	X	X	X	X	X	X		X	X	X	X	X	X	X
	-Engineer and Scientist Exchanges	X	X	X	X	X	X		X	X	X	X	X	X	X
	-NATO Air Force Armaments Group		X	X	X	X	X			X	X	X	X	X	
	-Four-Power Air Senior National	X			X		X		X		X	X	X	X	
	-Four-Power Long-Term Technology Projects		X		X		X		X		X		X		X
	-FCT Quarterly Reports	X	X	X	X	X	X		X	X	X	X	X	X	X
	-Nunn Quarterly Reports	X	X	X	X	X	X		X	X	X	X	X	X	X
	-FS-X Tech Assessments					X			X				X		

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